CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

DEVANG PATEL INSTITUTE OF ADVANCE TECHNOLOGY & RESEARCH .

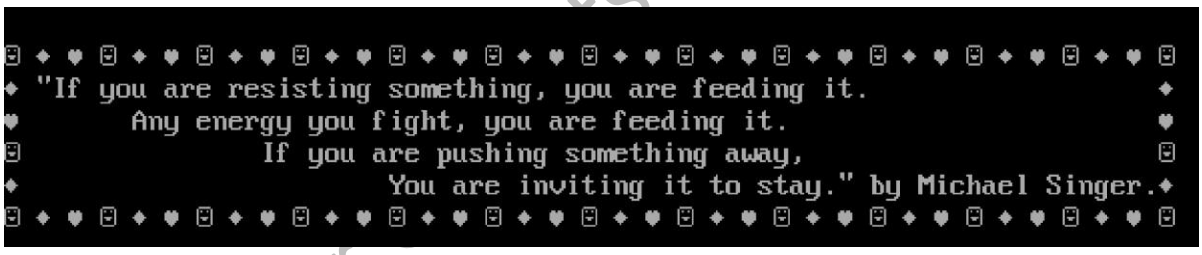
Department of Computer Engineering (CE)

Subject Code:- and Name : CE143 Computer Concepts and Programming

Semester : I

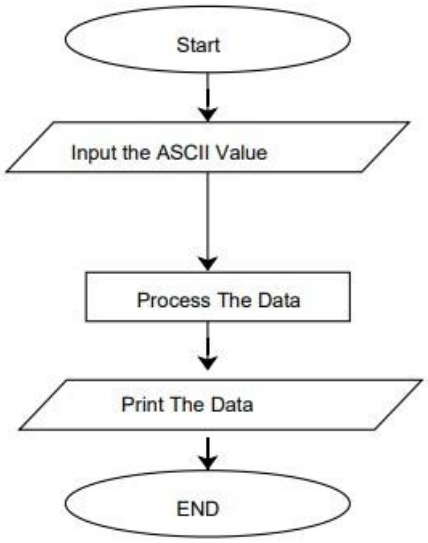
ID No : 22DCE006

Academic Year : 2022-2023

No.	Aim , Algorithm , Flowchart,Code,Output,etc…
1.1	Write a C program that will Output:- this passage by Michael Singer. Make sure your Output:- looks exactly as shown here (including spacing, line breaks, punctuation, and the title and author). Use Required Escape Sequence and ASCII Value. Outcome:  There are three shapes in the Output:-: Smiling Face, Diamond & Heart. The ASCII Value for Smiling face is 1. The ASCII Value for Diamond is 4. The ASCII Value for Heart is 3. **<u>Algorithm:-</u>** Step-1: Begin Step-2: Input the ASCII values for border Step-3: Input the passage given by Michel Singer Step-4: Print the passage

Step-5: End.

Flowchart:-

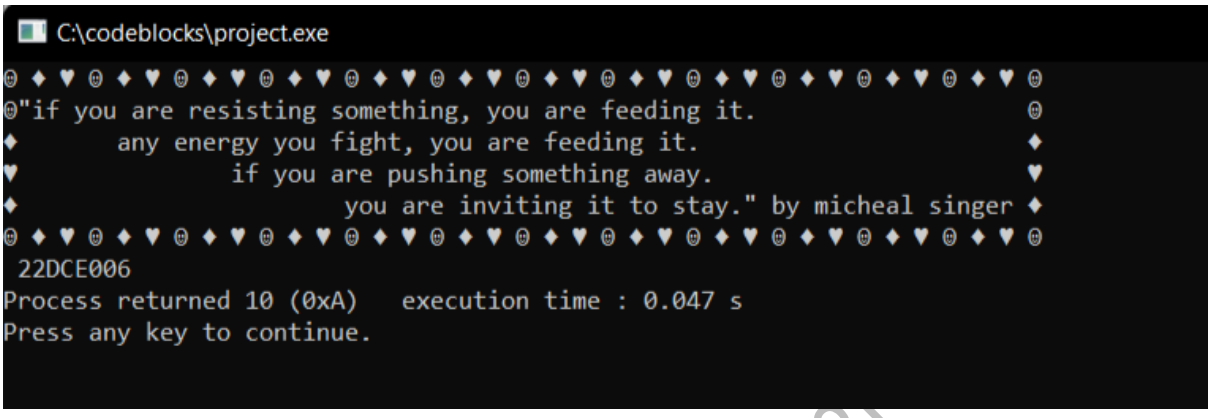


Code:-

```
#include<stdio.h>
void main()
        {
        printf("%c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c
        %c %c %c
        %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c \n", 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4,
        3, 1, 4,3, 1,
         4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1);
        printf("%c\"if you are resisting something, you are feeding it.\t\t\t%c\n", 1, 1);
        printf("%c\tany energy you fight, you are feeding it.\t\t\t%c\n", 4, 4);
        printf("%c\t\tif you are pushing something away.\t\t\t%c\n", 3, 3);
        printf("%c\t\t\tyou are inviting it to stay.\" by micheal singer\t%c\n", 4, 4);
        printf("%c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c
        %c %c %c
         %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c %c ", 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3,
        1, 4, 3, 1,
```

```
4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1, 4, 3, 1);

printf("\n 22DCE006");
```

Output:-



Questions:-

Have you learnt about ASCII values for different symbols other than smile, diamond and heart? If yes, then mention any 5 ASCII symbols and their values intabular format.

Sr.No.	Symbol	ASCII Value
1.	+	43
2.	-	45
3.	=	61
4.	$	36
5.	@	64

1.2 Write your bio-data using Escape Sequences. And you have to take your Basic Information as user input. It should contain the following content. It shouldcontain the following content.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of Output:-.

Outcome:

#=======#=======#=======#=======#=======#=======#=======#=======#

BIO - DATA

#=======#=======#=======#=======#=======#=======#=======#=======#

Basic Information

Name : XYZ
Address : XYZ
Mobile Number : 123
Gender : M/F
Date of Birth : DD/MM/YYYY

Education Qualification

- SSC -> Name of school -> Passing Year
  "Percentage"
- HSC -> Name of school -> Passing Year
  "Percentage"

Other Information

Technical Skills : 'JAVA', 'C', 'C++'
Hobbies : ABC, XYZ

#=======#=======#=======#=======#=======#=======#=======#=======#

THANK YOU

#=======#=======#=======#=======#=======#=======#=======#=======#

Algorithm:-

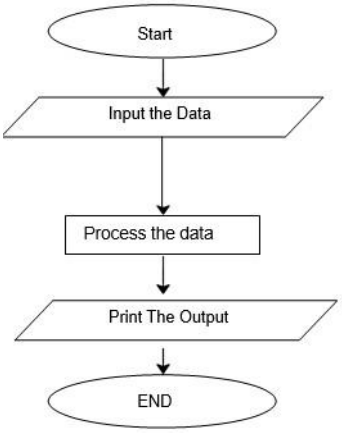
Step-1: Start

Step-2: Enter The data given in outcome

Step-3: Print the data

Step-4: End

Flowchart:-

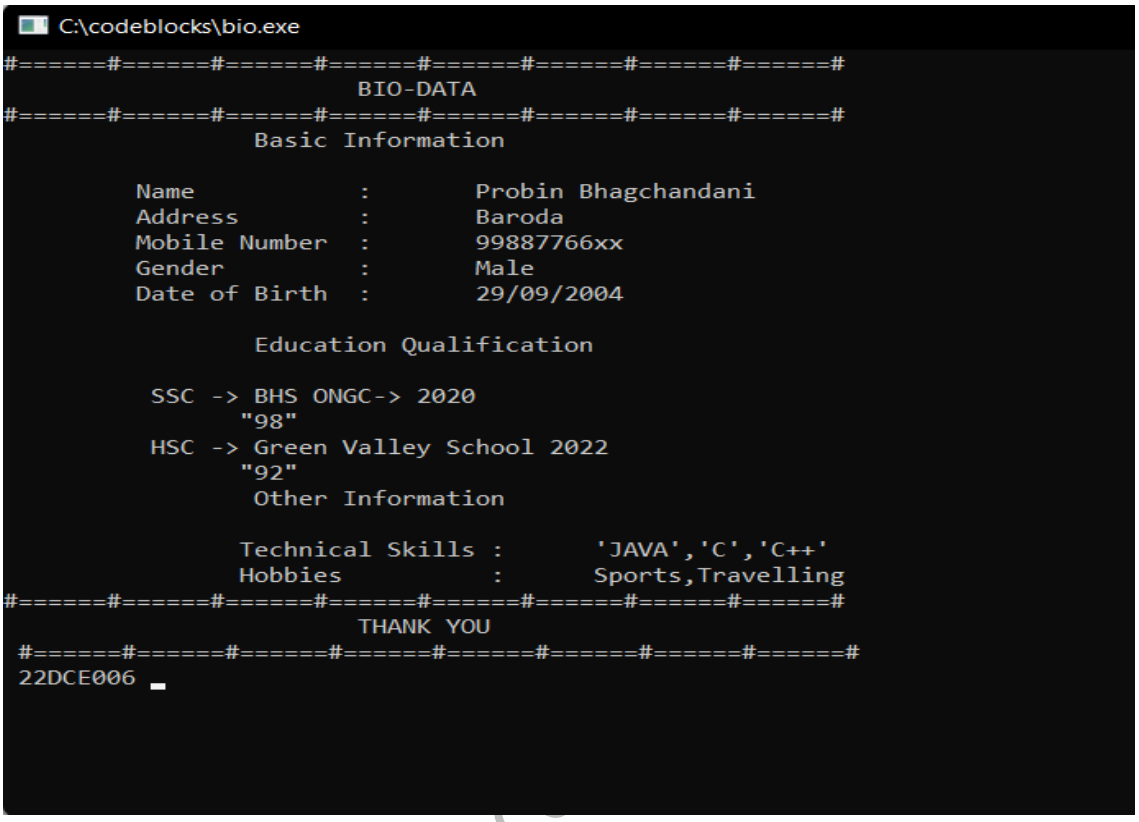


Code:-:

```
#include<stdio.h> void main()
{
System("cls");
printf("#======#======#======#======#======#======#======#======#\n");
printf("\t\t\tBIO-DATA\n");
printf("#======#======#======#======#======#======#======#======#\n");
printf("\t\t Basic Information\n");printf("\t\t  \n");
printf("\t Name\t\t:\tProbin Bhagchandani\n");printf("\t Address\t:\tBaroda\n");
printf("\t Mobile Number\t:\t99887766xx\n");printf("\t Gender\t\t:\tMale\n");
printf("\t Date of Birth\t:\t29/09/2004\n");printf("\n");
printf("\t\t Education Qualification\n");printf("\t\t....\n");
printf("\t %c SSC -> BHS ONGC-> 2020\n", 7);printf("\t\t\"98%\"\n"); printf("\t %c HSC -> Green
Valley School 2022\n",7); printf("\t\t\"92%\"\n");
printf("\t\t Other Information\n");printf("\t\t  \n");
printf("\t\tTechnical Skills :\t\'JAVA\'\,\'C\'\,\'C++\'\n");printf("\t\tHobbies\t\t
:\tSports\,Travelling\n");
printf("#======#======#======#======#======#======#======#======#\n");
printf("\t\t\tTHANK YOU\n");
printf("#======#======#======#======#======#======#======#======#\n");
printf("\n 22DCE006");
getch();
```

}

Output:-



Questions:

1. What is the purpose of using escape sequences? Answer in one or twostatements. Mention any 5 escape sequences used regularly along with their purpose.

Escape sequences are typically used to specify actions such as carriage returns and tab movements on terminals and printers. They are also used to provide literal representations of nonprinting characters and characters that usually have special meanings, such as the double quotation mark (").

Sr.No.	Escape Sequence	Purpose
1.	\t	Horizontal Tab

2.	\v	Vertical Tab
3.	\\	Backlash
4.	\n	Newline
5.	\b	Backspace

2.1 In a town, the percentage of men is 52. The percentage of total literacy is 48. If total percentage of literate men is 35 of the total population, write a program to find the total number of illiterate men and women if the population of the town is 80,000.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshotof Output:-

.

Fill below mentioned table as per your Output:-.

Sr.No.	Get Outcome	Value
1.	Total Population	80,000
2.	Number of Literate (Men + Women)	38,400
3.	Number of Men	41,600
4.	Number of Literate Men	13,439
5.	Number of illiterate Men	28,161
6.	Number of Women	38,400
7.	Number of Literate Women	24,961
8.	Number of illiterate Women	13,439

Algorithm

Step-1: Start

Step-2: Input the Value Of Men And Women

Step-3: Calculate Total population of the city

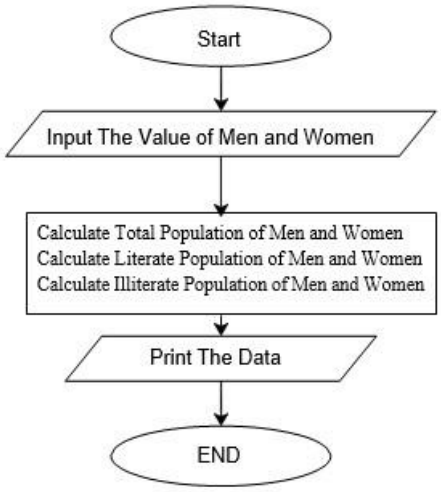
Step-4: Calculate Total Population of Men and Women

Step-5: Calculate Literate Population of Men and Women

Step-6: Calculate Illiterate Population of Men and Women

Step-7: Display The Illiterate Population of Men and WomenStep-8: End

Flowchart :

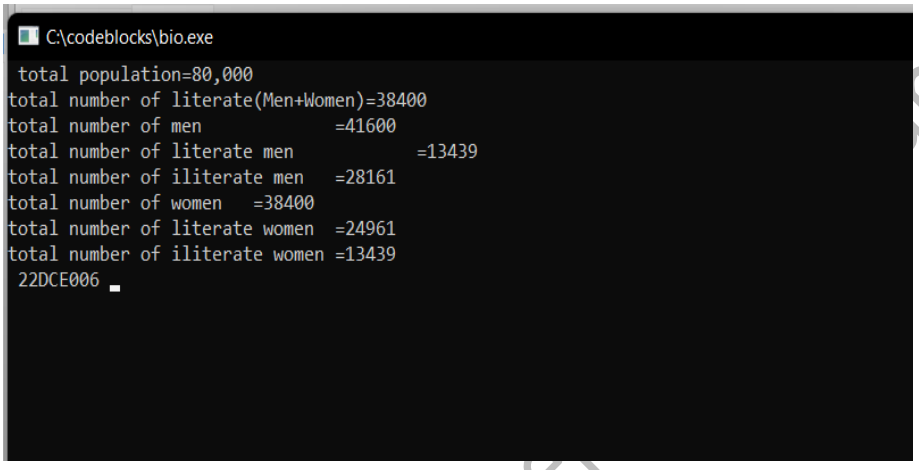


Code:-

```
#include<stdio.h>
void main()
{
long int tlit,men,women,ilmen,ilwomen,lmen,lwomen;
printf("total population=80,000\n");
tlit=80000*0.48;
men=80000*0.52;
women=80000-men;
lmen=tlit*0.35;
lwomen=tlit-lmen;
ilmen=men-lmen;
ilwomen=women-lwomen;
printf("total number of literate(Men+Women)=%li\n",tlit);
printf("total number of men =%li\n",men);
printf("total number of literate men =%li\n",lmen);
```

```
printf("total number of iliterate men  =%li\n",ilmen);
printf("total number of women          =%li\n",women);
 printf("total number of literate women        =%li\n",lwomen);
printf("total number of iliterate women        =%li\n",ilwomen);
printf(" 22DCE006");
getch();
}
```

Output:-



Questions:

Has this scenario helped you learn about integer and float datatype? If yes, then mentionthe requirements of using integer and float data types.
Float stores floating-point values, that is, values that have potential decimal places.
Float are used when more precision is needed.

Int only stores integral values, that is, whole numbers

2.2	A Bigbazaar cashier has currency notes of denominations 10,50 and 100. If the amount tobe withdrawn is input through the keyboard in hundreds, find the total number of currencynotes of each denomination the cashier will have to give to the withdrawer. Expected Outcome: Draw flowchart, write algorithm and program for given scenario. Also attach screenshotof Output:-

Fill up the required number of currency notes of denomination 10, 50 and 100 in belowgiven table as per the Output:- received.

Sr.No.	Note Requirements	Counts
1.	100 Rs Note	49
2.	50 Rs Note	0
3.	10 Rs Note	0

Algorithm

Step-1: Start

Step-2: Input The Data From user

Step-3: Calculate the requied note of 100:

Number of 100 rs note = amount/100Calculate the requied note of 50:

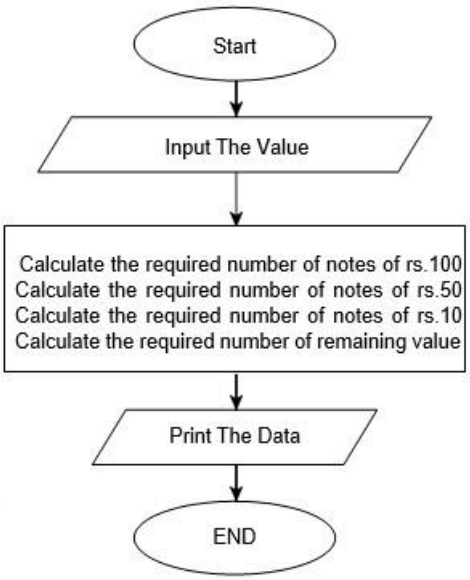
Number of 100 rs note = (amount%100)/50Calculate the requied note of 10:

Number of 100 rs note = ((amount%100)%50)/10Calculate remaining value:

Step-4: Print Required Note Of 100,50,10.

Step-5: End

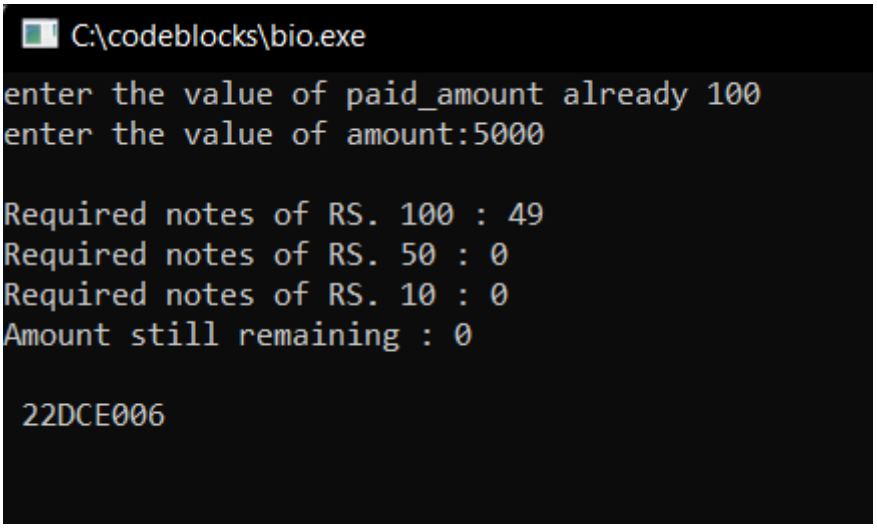
Flowchart



Code:-

```
#include<stdio.h>
int main()
{
int amount,paid_amount,ans;
printf("enter the value of paid_amount already " );
scanf("%d",&amount);
printf("enter the value of amount:");
scanf("%d",&paid_amount);
 ans=paid_amount-amount;
 printf("\nRequired notes of RS. 100 : %d",ans/100);
printf("\nRequired notes of RS. 50 : %d",(ans%100)/50);
printf("\nRequired notes of RS. 10 : %d",((ans%100)%50)/10);
 printf("\nAmount still remaining : %d",((ans%100)%50)%10);
printf(" \n\n 22DCE006 ");
getch();
}
```

Output:-



Questions:

Have you learned about how scanf function can be used to collect the user input?Give the correct answer for the following table:

Sr.No.	Data Type	Format Specifier	Example
1.	Integer Data Type	%d	77
2.	Float Data Type	%f	77.77
3.	Character Data Type	%c	P

2.3 Write a program to calculate Net Salary. User has to input Basic Salary and Output:- shouldbe:

Enter Basic Salary: 5000 (e.g. 5000) Allowances:

DA = 70% of Basic Salary

HRA = 7% of Basic Salary

MA = 2% of Basic Salary

TA = 4% of Basic Salary Deduction:

PF = 12% of Basic Salary

IT = any value (e.g. 50)

Net Salary = Basic Salary + Allowances – Deduction

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attachscreenshot of Output:-.

Fill up the data mentioned in below given table as per the Output:- received.

Sr.No.	Inputs/Output:-s	Amount
1.	Enter your Basic Salary	500
2.	DA of Basic Salary	350
3.	HRA of Basic Salary	35
4.	MA of Basic Salary	10
5.	TA of Basic Salary	20
6.	PF of Basic Salary	60
7.	Gross Salary	915
8.	Net Salary (at end)	805

Algorithm

Step-1: Start

Step-2: Input The Basic Salary From user

DA=70% of basic salary

HRA=7% of basic salary MA=2% of basic salary

TA=4% of basic salary PF=12% of basic salaryIT=value by user

Step-3: Calculate Allownces=(DA+HRA+MA+TA)

Calculate Deduction=(PF+IT)

Calculate Net salary=Basic salary + Allownces – Deduction

Step-4: Print Basic Salary

DA HRA MA TA PF IT

Net salary

Code:-

```
#include<stdio.h>
 int main()
```

```
{
int bs,da,hra,ma,ta,pf,it,ns,allownces,deduction;
system("cls");
printf(" 22DCE006 ");
 printf("\nEnter Basic Salary: ");
  scanf("%d",&bs);
da=(70*bs)/100;
hra=(7*bs)/100;
ma=(2*bs)/100;
ta=(4*bs)/100;
allownces=(da+hra+ma+ta);
pf=(12*bs)/100;
it=50;
 deduction=(pf+it);
ns=bs+allownces-deduction;
printf("\nAllownces:");
printf("\n\tDA = %d",da);
printf("\n\tHRA = %d",hra);
printf("\n\tMA = %d",ma);
 printf("\n\tTA = %d",ta);
  printf("\n\nDeduction:");
  printf("\n\tPF = %d",pf);
  printf("\n\tIT = %d",it);
  printf("\nNet Salary is %d",ns);
  return 0;

getch();
}
```

Output:-

```
C:\codeblocks\bio.exe
 22DCE006
Enter Basic Salary: 500

Allownces:
        DA = 350
        HRA = 35
        MA = 10
        TA = 20

Deduction:
        PF = 60
        IT = 50
Net Salary is 805
Process returned 0 (0x0)   execution time : 2.457 s
Press any key to continue.
```

Questions:

Have you learned about various data types that can be suitably used for this problem? Do mention which data types can be used and why? Also mention the difference betweenthe Output:-s.

we can use float and int data types. Using of them we can calculate the da, hra,ma,ta,pf,it and net salary.If we use float then we can get aaccurate answer butwhen we use int datatype we get the nearest amount as a answer.

3.1	Write a program that takes the length of the pendulum as input and then calculate the time period of thependulum. Provided that, $T=2\pi\sqrt{L/G}$. Define the value of π as 3.14 and take L as the length of the pendulum and G as the acceleration of gravity either in m/s or as input from the keyboard. Display the time period rounded to 2 decimal places. Hint: Use Math.h header file, use #define for specifying the value of π

Algorithm:-

Step-1: Start

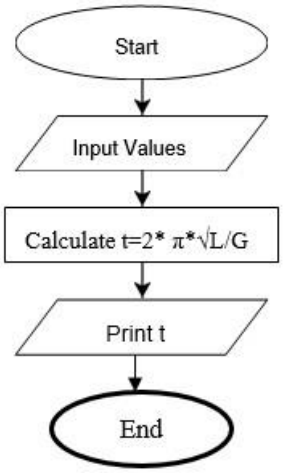
Step-2: Enter The Values

Step-3: Calculate t=2*π*√L/G

Step-4: Print t

Step-5: End

Flowchart:-

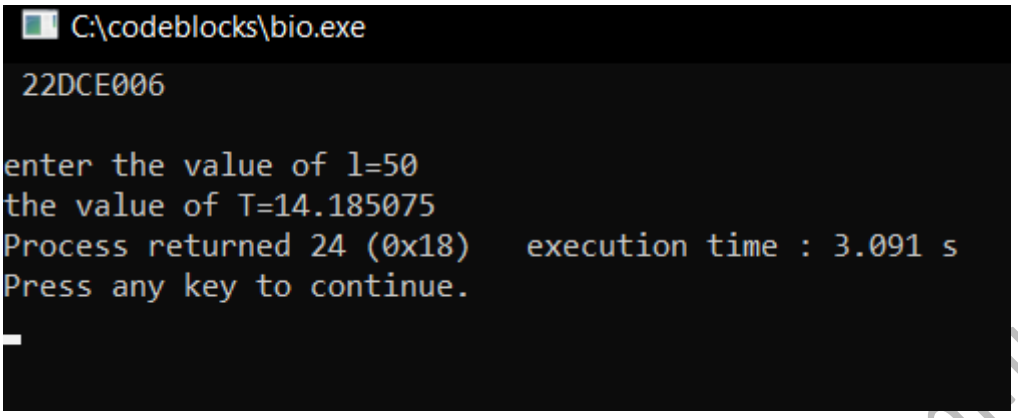


Code:-

```
#include<stdio.h>
 #include<math.h>
 #define g 9.8
#define pi 3.14
 void main()
{
float l,t,u,v;
printf(" 22DCE006 \n\n");
printf("enter the value of l="); scanf("%f",&l);
t=2*pi; u=sqrt(l/g); v=t*u;
printf("the value of T=%f",v);
```

}

Output:-



Questions:

1. Have you learned about, how math function is useful for calculating square root? Which datatypeis supported by all math functions? Also mention any 5 math functions with their purpose.

Sr.No.	Math Function	Description
1.	Sqrt(x)	To Find a Square root of a number
2.	Exp(x)	To Find the exponential of a function
3.	Log(x)	To Find The Log of Function
4.	Sin(x)	To Find The Sin Value of Number
5.	Cos(x)	To Find The cos Value of Number

3.2 Let us understand the working of Pre-increment, Post-increment, Pre-decrement andPost-decrement

a) Consider a scenario where, Boys are playing in the park and collecting and removing the yellow balls from the bucket based on teacher's instruction. Let's say there are already 10 Yellowballs present in a bucket. Following is the sequence of the instructions given by the teacher for adding/removing the balls.

i) Rajiv: ++ Yellow

ii) Preet: --Yellow

iii) Raj: Yellow++

iv) Ritul: Yellow--

Expected Outcome:

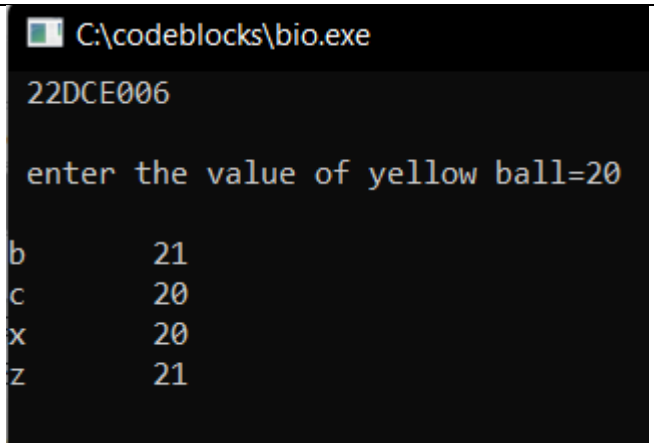
Fill up the data mentioned in below given table as per the Output:- received.

Sr.No.	Instructions	Yellow
1.	Count before execution	80
2.	Count after execution	82

Code:-

```
#include<stdio.h>
 void main()
{
int a,b,c,x,z;
printf(" 22DCE006\n\n ");
printf("enter the value of yellow ball=");
scanf("%d",&a);
b=++a;
c=--a;
x=a++;
z=a--;
printf("\nb\t%d",b);
printf("\nc\t%d",c);
 printf("\nx\t%d",x);
  printf("\nz\t%d",z);
   getch();
}
```


Output:-



b) Consider another scenario where boys and girls both are asked to add/remove Yellow and Pink balls from the bucket respectively. Currently there are 10 Yellow balls in the bucket and 20 Pink balls.

Teacher has given the sequence of instructions as below for adding/removing the balls.Calculate = ++Yellow + Yellow++ + --Yellow + ++Pink - --Pink - --Pink

Get the count of Yellow and Pink balls after evaluating above given scenario

Expected Outcome:

Fill up the data mentioned in below given table as per the Output:- received.

Sr.No.	Instructions	Yellow	Pink
1.	Count before execution	10	20
2.	Count after execution	10	19

Also get the count of calculate and explain how it is calculated in stepwise manner. (hint: left to right, as per memory)

Algorithm:-

Step-1: Start

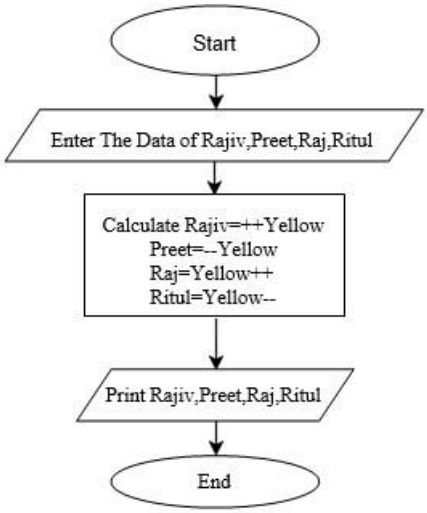
Step-2: Enter The data of Rajiv,Preet,Raj,Ritul

Step-3: Calculate Rajiv=++Yellow, Preet=--Yellow, Raj=Yellow++, Ritul=Yellow—

Step-4: Print Value Of Rajiv,Preet,Raj,Ritul

Step-5: End

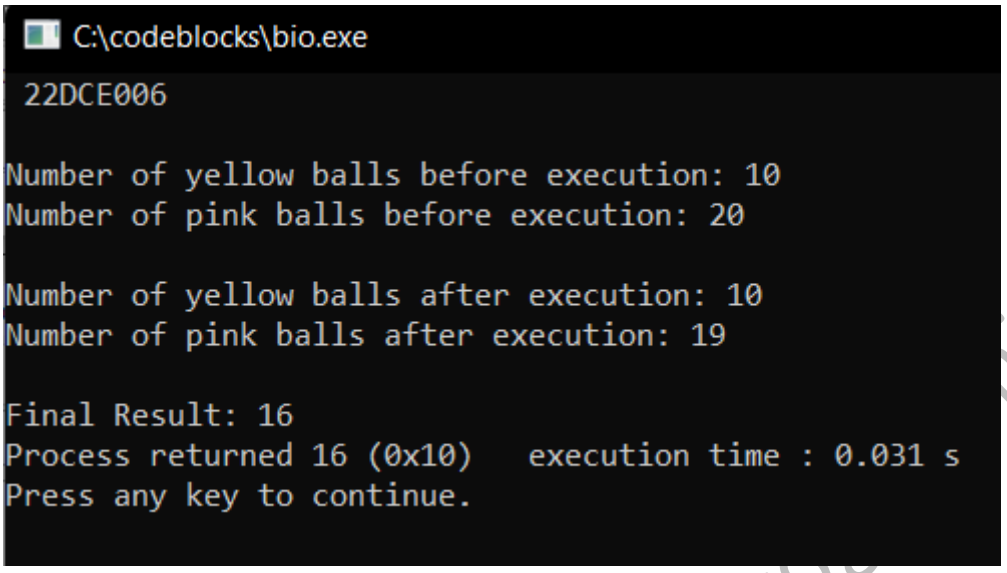
Flowchart:-



Code:-

```
#include<stdio.h>
 #include<conio.h>
  void main()
{
int y=10, p=20, result;
int yellow=10, pink=20;
printf(" 22DCE006\n\n");
printf("Number of yellow balls before execution: %d\n",y);
 printf("Number of pink balls before execution: %d\n\n",p);
  y=++y;
y=y++;
 y=--y;
p=++p;
 p=--p;
p=--p;
printf("Number of yellow balls after execution: %d\n",y);
 printf("Number of pink balls after execution: %d\n\n",p);
  result=++yellow + yellow++ + --yellow + ++pink - --pink - --pink;
   printf("Final Result: %d",result);
}
```

Output:-



Questions:

Have you understood the working of Pre-increment, Post-increment, Pre-decrement and Post-decrement?

Ans- Yes

3.3 Write a C program to swap two numbers (use two variables for collecting value from user) without using third variable. (Hint: Use arithmetic operators)

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of Output:-. Fill up the Output:- as per the Output:- received in console.

Sr.No.	Instructions	Number1	Number2
1.	Before Swapping	7	10
2.	After Swapping	10	7

Algorithm:-

Step 1:- Start

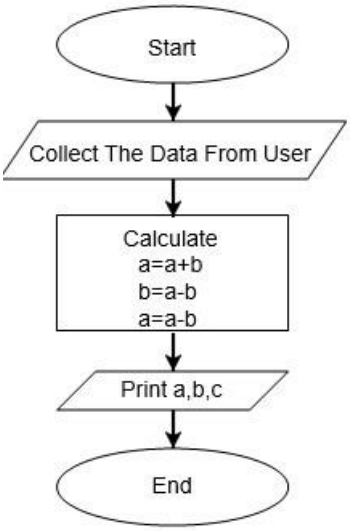
Step 2:- Collect The Value From the user

Step 3:- a=a+b, b=a-b, a=a-b

Step 4:-Print a,b,c

Step 5:- Stop

Flowchart:-

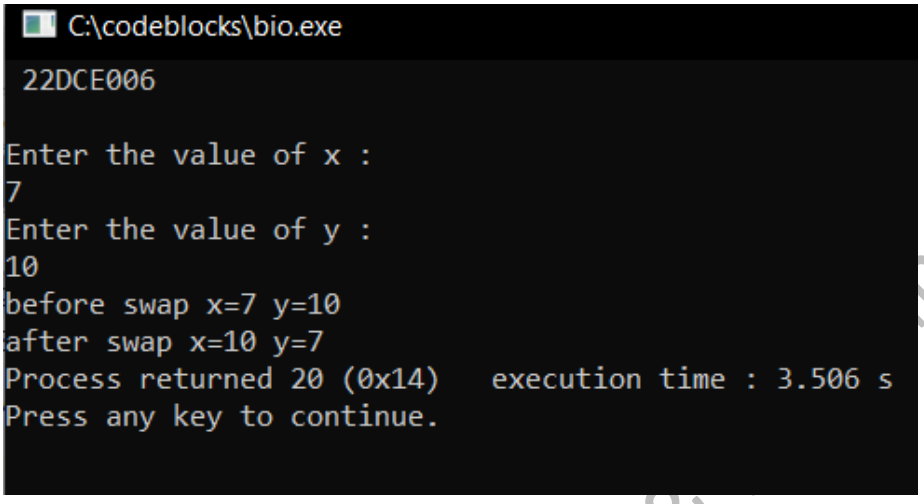


Code:-

```
#include<stdio.h>
void main()
{
int x,y;
printf(" 22DCE006 \n\n");
      printf("Enter the value of x :\n");
scanf("%d", &x);
printf("Enter the value of y :\n");
scanf("%d", &y);
printf("before swap x=%d y=%d",x,y);



          x=x+y;
           y=x-y;
```

```
x=x-y;
printf("\nafter swap x=%d y=%d",x,y);
}
```

Output:-



Questions:

Have you learned about, how we can use arithmetic operators for swapping the numbers?

Yes, With Using arithmetic Operators We Can Swap The Numbers Without Using ThirdVariable.

4.1

a. Write something about your characteristics not more than 50 words using gets function and printout the same using puts function.

Expected Outcome:

Draw flowchart, write algorithm and write program for given scenario. Also attach the screenshotof Output:-.

Questions:

1. What is the significance of using gets and puts? Are they acting as replacement of anyfunction? How?

b. Write a program to convert the decimal number into octal and hexadecimal format. Printhexadecimal and octal values for given inputs in expected outcomes.

Hint: Use %o and %x Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of Output:-

.Fill up the Output:- as per the inputs mentioned in below given table as per the Output:- received in console.

Sr.No.	Inputs	Octal	Hexadecimal
1.	Your Roll No		
2.	143		
3.	0		
4.	1		
5.	-1		

Algorithm:-

Step 1:-Start

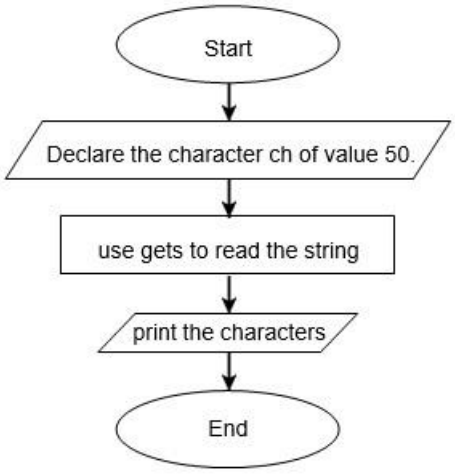
Step 2:-Declare the character ch of value 50.

Step 3:- use gets to read the string.

Step 4:- print the characters stored in ch

Step 5:- Stop

Flowchart:-



Code:-

```
#include <stdio.h>
int main()
```

```
{
char ch[50];
printf(" 22DCE006 \n\n ");
printf("Enter the string: ");
gets(ch);
printf("you entered string here\n");
printf(ch);
}
```

Output:-

```
C:\codeblocks\bio.exe
22DCE006

 Enter the string: Hello Everyone this practical was fun !!!!!!!!!1
you entered string here
Hello Everyone this practical was fun !!!!!!!!!1
Process returned 0 (0x0)   execution time : 20.279 s
Press any key to continue.
```

Algorithm

Step-1:Start

Step-2: Enter value of int.

Step-3: Print the value of Decimal value.

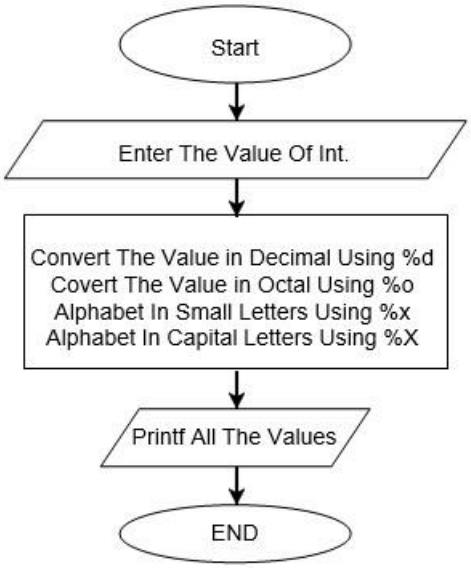
Step-4: Print the value of Octal value

Step-5: Print the value of Hexadecimal value in Alphabet in small letters

Step-6: Print the value of Hexadecimal value in Alphabet in capital letters

Step-7: End

Flowchart



Code:-

```
#include <stdio.h>
 void main()
{
int value;
printf("22DCE006 \n\n ");
printf("Enter the Value:");
 scanf("%d", &value);
printf("Decimal value will be : %d\n",value);
printf("Octal value will be : %o\n",value);
printf("Hexadecimal value will be (Alphabet in small letters): %x\n",value);
printf("Hexadecimal value will be (Alphabet in capital letters): %X\n",value);
 getch();
}
```

Output:-

```
C:\codeblocks\bio.exe
22DCE006

 Enter the Value:77
Decimal value will be : 77
Octal value will be : 115
Hexadecimal value will be (Alphabet in small letters): 4d
Hexadecimal value will be (Alphabet in capital letters): 4D
```

Questions:-

What is the significance of using gets and puts? Are they acting as replacementof any function? How?

The gets() and puts() are declared in the header file stdio.h. Both the functions are involvedin the input/Output:- operations of the strings.

the printf() function is used to print both strings and variables to the screen while the puts() function only permits you to print a string only to your screen. puts is the simple choice andadds a new line in the end and printf writes the Output:- from a formatted string.

4.2 Write a C Program to Print multiplication table from 1 to 7 to achieve the following Output:-.(Use #define directives and do while loop)

Expected Outcome:

Draw flowchart, write algorithm and write program for given scenario.

Algorithm

Step 1:Start

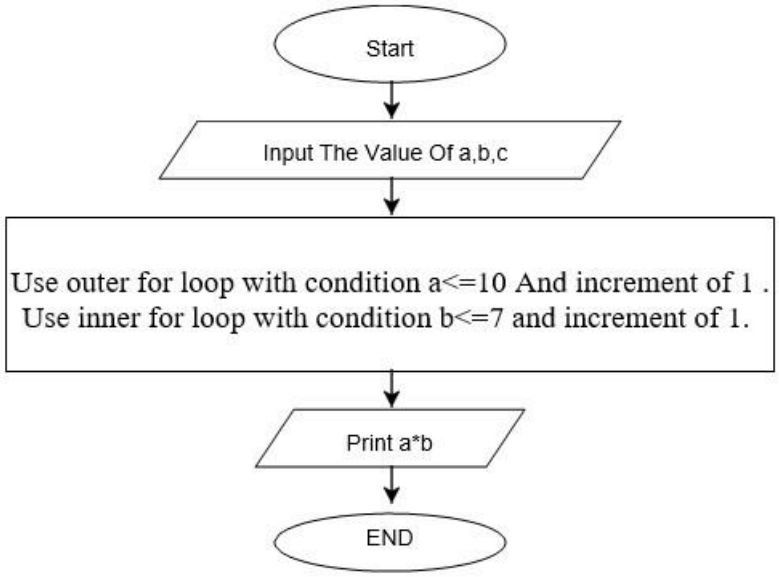
Step 2:Input the value of a,b,c.

Step 3: Use outer for loop with condition a<=10 And increment of 1 .

Step 4: Use inner for loop with condition b<=7 and increment of 1.

Step 5: Print a*bStep 6:Stop.

Flowchart



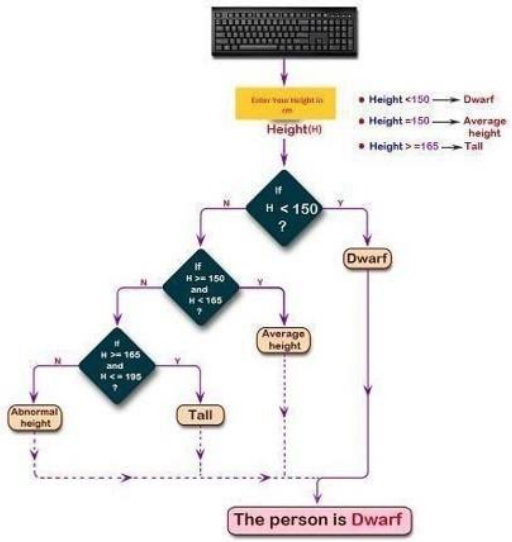
Code:-

```
#include<stdio.h>
 void main()
{
int a,b,c;
printf(" 22DCE006 \n\n\n\n ");
printf("Multiplication Table (1 To 7)\n");
 printf("*****************************************\n");
   for(a=1;a<=10;a++)
   {
      for(b=1;b<=7;b++)
         {
            printf("%d\t" ,a*b);
         }
      printf("\n");
   }
getch();

}
```

Output:-

```
C:\codeblocks\bio.exe
22DCE006


 Multiplication Table (1 To 7)
****************************************
1       2       3       4       5       6       7
2       4       6       8       10      12      14
3       6       9       12      15      18      21
4       8       12      16      20      24      28
5       10      15      20      25      30      35
6       12      18      24      30      36      42
7       14      21      28      35      42      49
8       16      24      32      40      48      56
9       18      27      36      45      54      63
10      20      30      40      50      60      70
```

5.1 Write a C program for the given scenario from the flowchart. Note that you have to enter your ownheight in centimeters.



Expected Outcome:

Write algorithm and write program for given scenario. Also attach screenshot of Output:-.Tick marks your achieved result in the appropriate column:

Sr.No.	Inputs(cm)	Dwarf	Average	Tall	Abnormal
1.	Your height				
2.	Your Mother's height				
3.	Your Father's height				
4.	Your Sibling's height				

Algorithm:-

Step-1: Start

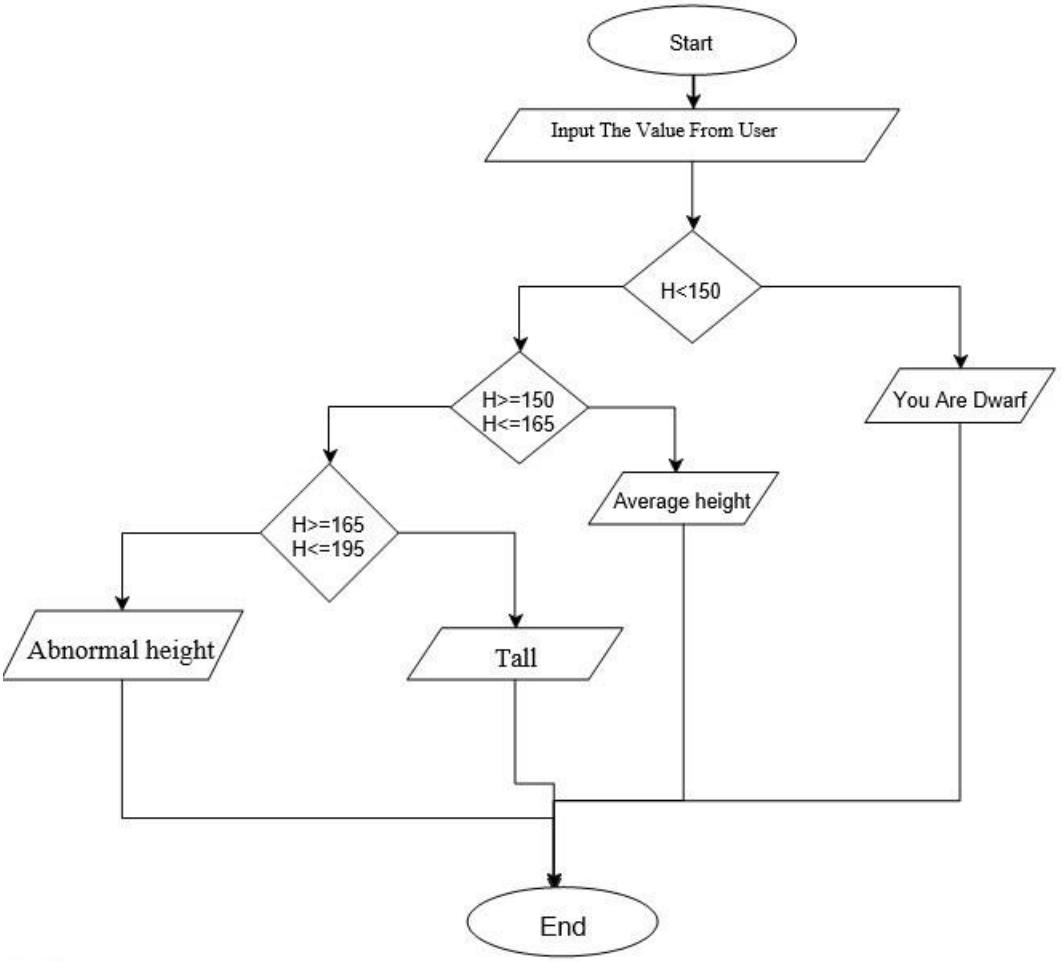
Step-2: Enter Data From User

Step-3: Calculate Height And Give Output:-

Step-4: Print The Output:-

Step-5: End

Flowchart

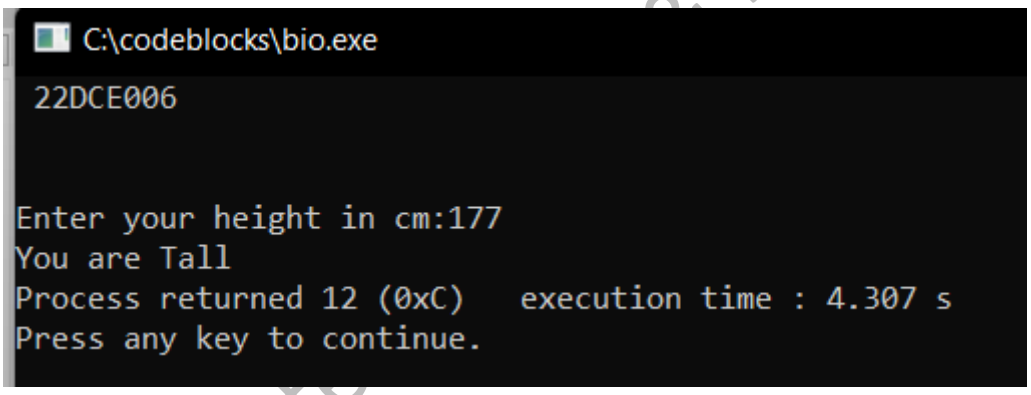


Code:-

```
#include<stdio.h>
void main ()
{

int H;
printf(" 22DCE006 \n\n\n");
printf("Enter your height in cm:");
scanf("%d",&H);
   if(H<150)
   {
      printf("You are Dwarf");
   }
   else if(H>=150 && H<165)
   {
```

```
        printf("You are Average Height");
    }

    else if(H>=165 && H<=195)
    {
        printf("You are Tall");
    }

    else
    {
        printf("You Have Abnormal height");
    }
}
```

Output:-



5.2	Write a C program to find all roots of a Quadratic equation using nested switch case. Take three user inputs from keyboard for finding the discriminant (b2 – 4ac). Use the concept of nested switchcase for finding the roots of equation. Get the Output:-s for roots till 2 decimal points only. Hint: Discriminant > 0 root1 = (-b + sqrt(discriminant)) /(2*a) root2 = (-b - sqrt(discriminant)) / (2*a) Discriminant < 0 root1 = root2 = -b / (2*a) imaginary = sqrt (-discriminant) / (2*a) (eg. Print it as: i20.3, i.e. i followed by value) Discriminant **= 0** root1 = root2 = -b / (2*a) Expected Output:-

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of Output:-. Input values in the console as per the table given below and write the results in the table, based on received Output:-.

Sr.No.	Inputs			Root1	Root2	Imaginary
	a	b	c			
1.	1	2	3			
2.	3	7	-5			
3.	9	12	4			

Algorithm

Step 1: Start

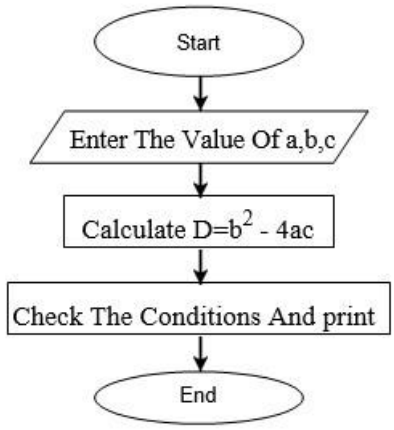
Step 2: Enter The Value Of a,b,c

Step 3: Calculate $D=b^2 - 4ac$

Step 4: Check The Conditions And print

Step 5: End

Flowchart



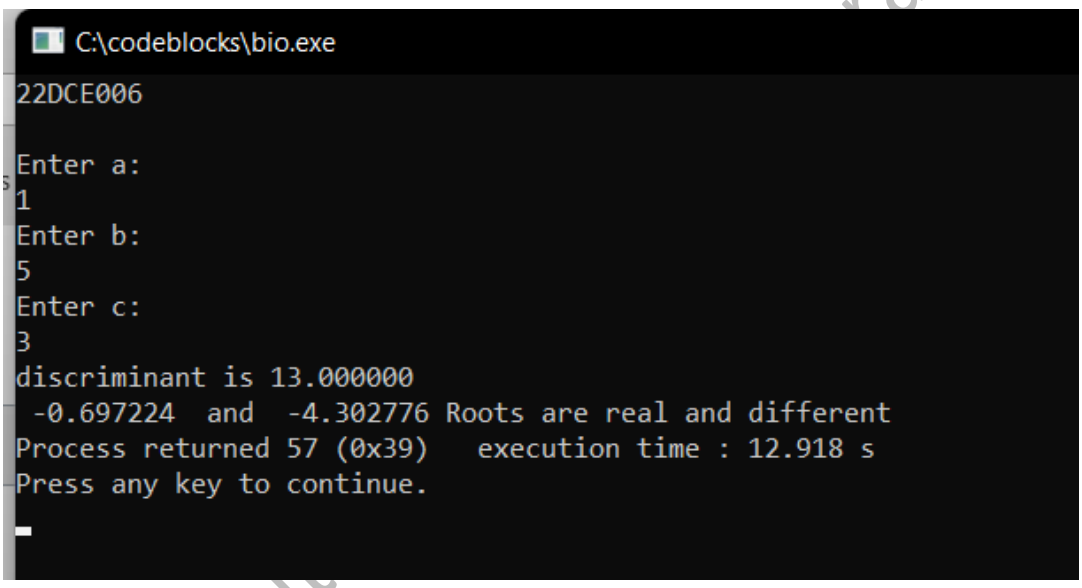
Code:-

```
#include<math.h>
void main()
{
```

```
float a,b,c,r1,r2,im,d;

printf("22DCE006 \n\n");
printf("Enter a: \n");
scanf("%f",&a);

printf("Enter b: \n");
scanf("%f",&b);

printf("Enter c: \n");
scanf("%f",&c);

d=(b*b)-(4*a*c);
printf("discriminant is %f",d);

switch(d>0)
{
   case 1:
   r1=(-b+sqrt(d))/(2*a);
   r2=(-b-sqrt(d))/(2*a);
   printf("\n %f  and  %f Roots are real and different ",r1,r2);
   break;



   case 0:

    switch(d<0)
      {
         case 1:
         r1=(-b)/(2*a);
         im=sqrt(-d)/(2*a);
         printf("\n %f  and  %f Roots are not real and different ",r1,im);
         break;
```

```
            case 0:


            r1=(-b)/(2*a);
            r2=r1;
            printf("\n %f  and  %f Roots are real and equal ",r1,r2);
            break;
        }
    }
}
```

Output:-



Questions:

Have you learned about how to use normal switch case and nested switch case?

Ans:- Yes

Is default case necessary for every switch case?

Ans**:-** No it is not necessary of default case in a switch statement and there is no rule of keeping default case at the end of all cases it can be placed at the starting andd middle of allother cases.

What if break statement is not mentioned between two consecutive cases?

	Ans:- If we do not use break statement at the end of each case, program will execute all consecutive case statements until it finds next break statement or till the end of switch caseblock.

5.3	If the ages of Ram, Shyam and Ajay are input through the keyboard, write a program to determinethe youngest of the three. If all of them are of same age then print that "All are of same age". (Hint:Use Nested if else statement) Expected Output:- Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of Output:-. Take different input values as per your wish and given scenario get Output:-.

Sr. No.	Inputs			Expected Output
	Ram	Shyam	Ajay	
1.	Same	Same	Same	All are of equal age
2.	Different	Different	Different	Ram/Shyam/Ajay is youngest
3.	Same	Same	Different	Ram and Shyam are equal
4.	Different	Same	Same	Shyam And Ajay are equal
5.	Same	Different	Same	Ram And Ajay Are Equal

Algorithm:-

Step-1 : Start

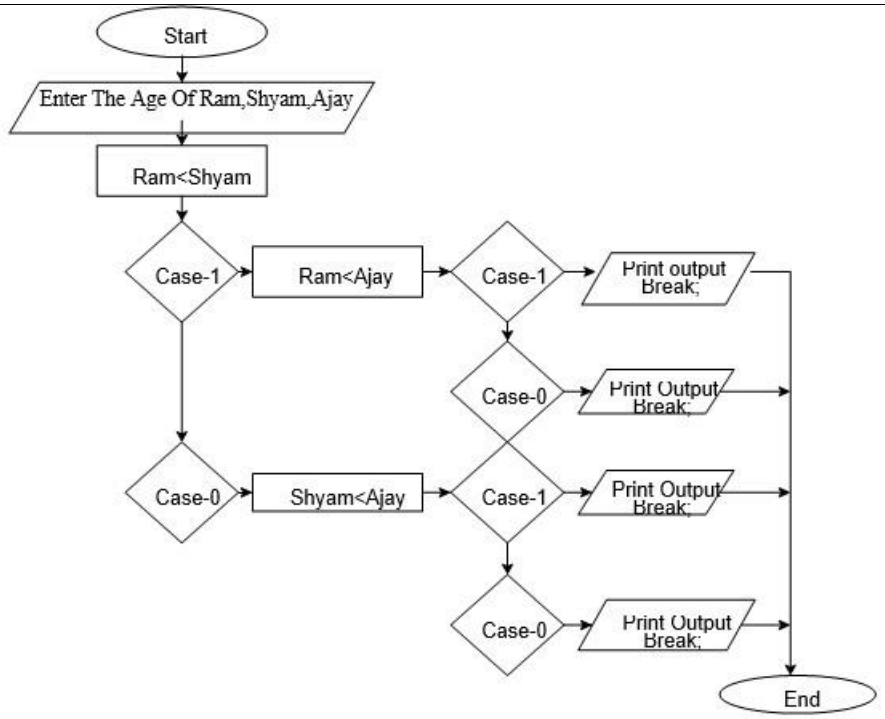
Step-2 : Enter The Age Of Ram, Shyam, Ajay

Step-3 : Find youngest among ram, shyam and ajay using Nested Switch.

Step-4 : Print The Data

Step-5 : End

Flowchart



Code:-

```
#include<stdio.h>
void main()
{
        int r,s,a;
        printf(" 22DCE006 \n\n ");
        printf("Enter ram's age : ");
        scanf("%d",&r);
        printf("Enter shyam's age : ");
        scanf("%d",&s);
        printf("Enter ajay's age : ");
        scanf("%d",&a);
        if(r!=s || s!=a || a!=r)
        {
            if(r!=s && s!=a && a!=r)
          {
            if(r<s)
                {
                    if(r<a)
```

```
                                    {
                                      printf("ram is young");
                                     }
                              else
                                    {
                                      printf("ajay is young");
                                     }
                         }
                    else
                         {
                             if(s<a)
                               {
                                   printf("shyam is young");
                               }
                    else
                        {
                            printf("ajay is young");
                        }
               }
}
else if(r==s && a!=r && r<a)
{
printf("ram and shyam are equal and young");
}
else if(r==s && a!=r && a<r)
{
printf("ram and shyam are equal but ajay is young");
}
else if(r==a && s!=r && r<s)
{
printf("ram and ajay are equal and young");
}
else if(r==a && s!=r && s<r)
```

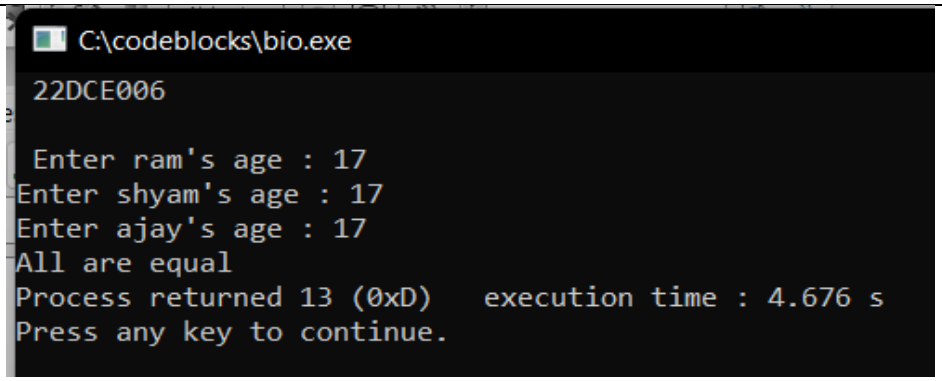
```
{
printf("ram and ajay are equal but shyam is young");
}
else if(s==a && r!=s && s<r)
{
printf("shyam and ajay are equal and young");



        }
else if(s==a && r!=s && r<s)
{
printf("shyam and ajay are equal but ram is young");
}
else
{
printf("try again");
}
}
else
{
printf("All are equal");
}

}
```

Output:-

```
C:\codeblocks\bio.exe
 22DCE006

 Enter ram's age : 15
Enter shyam's age : 16
Enter ajay's age : 17
ram is young
Process returned 12 (0xC)   execution time : 7.469 s
Press any key to continue.
```

```
C:\codeblocks\bio.exe
 22DCE006

 Enter ram's age : 16
Enter shyam's age : 15
Enter ajay's age : 17
shyam is young
Process returned 14 (0xE)   execution time : 4.748 s
Press any key to continue.
```

```
C:\codeblocks\bio.exe
 22DCE006

 Enter ram's age : 18
Enter shyam's age : 17
Enter ajay's age : 14
ajay is young
Process returned 13 (0xD)   execution time : 4.768 s
Press any key to continue.
```



Questions:-

1. Have you tried merging the concepts of Nested if else and else if ladder in thisscenario?

Ans:- Yes

2. Differentiate the concept of Nested if else and else if ladder.

Ans:- Nested if()...else statements take more execution time (they are slower) in comparison to an if()...else ladder because the nested if()...else statements check all the inner conditional statements once the outer conditional if() statement is satisfied, whereasthe if()..else ladder will stop condition testing once.

5.4 The policy followed by a company to process customer orders is given by the following rules:
Suppose stock=100
If a customer order is less than or equal to that in stock and 'has credit' is OK, supply 'has requirements.
If 'has credit' is not OK do not supply. Send him intimation.
If 'has credit' is OK but the item in stock is less than 'has ordered', inform 'out of stock' and intimate him that the balance will be refunded. Write a C program to implement the companypolicy.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of Output:-.
Give the inputs in the console as per the below given table, and provide the Output:- accordingly.

Sr. No.	Inputs			Output
	Credit	Order	Stock	
1.	Y or y	20	100	
2.	N or n	50	80	
3.	Y or y	50	80	
4.	Y or y	70	30	
5.	Y or y	30	30	

Algorithm:-

Step-1: Start

Step-2: Assign Value Of Stock

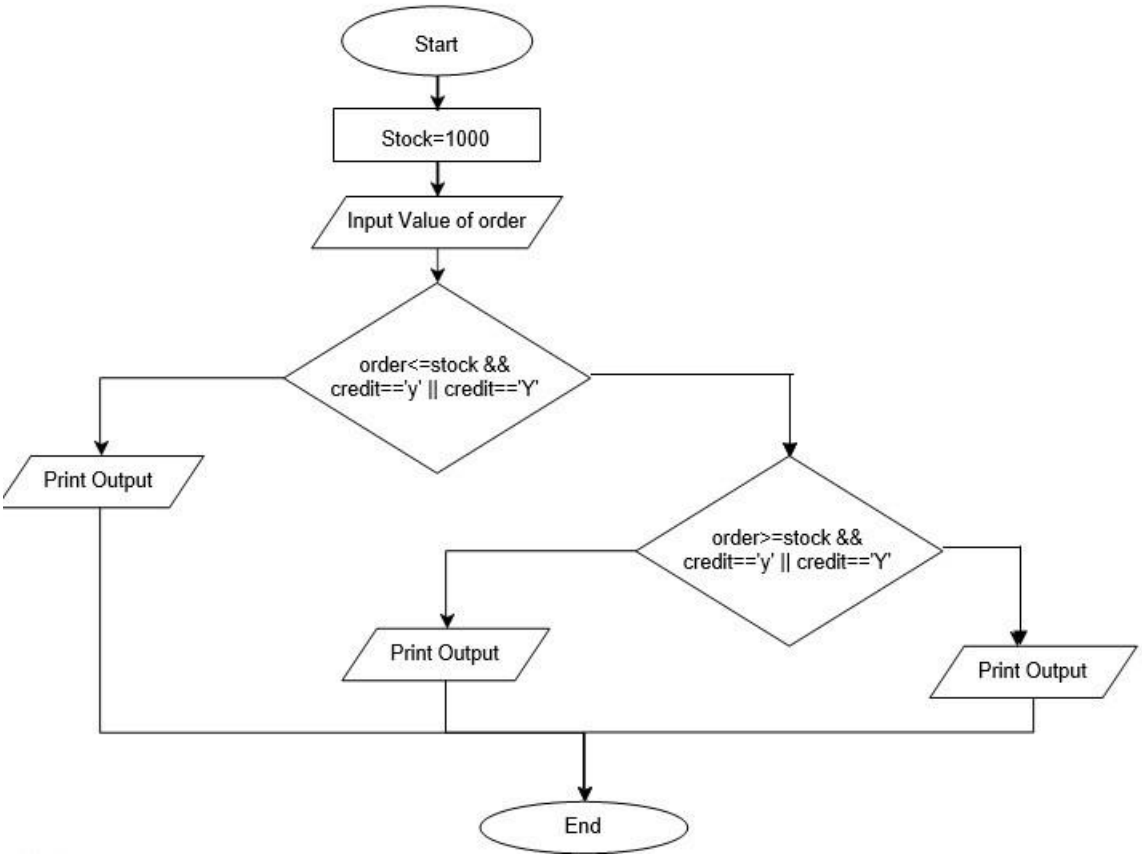
Step-3: Ask for Credit from user.

Step-4: Input Values says Stock.

Step-5: Print Output:- as policy given in question

Step-6: Stop

Flowchart:-



Code:-

#include<stdio.h>

```
void main()
{
int stock=1000,order; char credit;
printf("22DCE006 \n\n");

printf("Enter y/Y if his credit is ok else n/N\n");
scanf("%c" ,&credit);
printf("Enter the customer order:\n");
scanf("%d" ,&order);
   if (order<=stock && credit=='y' || credit=='Y')
   {
      printf("ok order confirmed \n\tQuantity:%d",order);
   }
   else if(order>stock && credit=='y' || credit=='Y')
   {
      printf("order is greater than stock . please wait ");
   }
   else
   {
      printf("Sorry  please check  your credit");
   }




}
```

Output:-

```
C:\codeblocks\bio.exe
22DCE006

Enter y/Y if his credit is ok else n/N
Y
Enter the customer order:
700
ok order confirmed
        Quantity:700
Process returned 33 (0x21)   execution time : 6.256 s
Press any key to continue.
```

6.1

There is a person, who is asked to enter the alphanumeric password for registering into an ecommerce website for purchasing products from website. But he is not aware about, what does Alphanumeric mean. So, he tries entering various combinations 5 times, but he fails to create such password. So let us help him by writing a C program to validate his password. Constraints for writing password are it should have combination of lowercase, uppercase and digit.

Note: Use Do while loop, and give print appropriate outputs on incorrect validations.

Expected Outcome:

Draw flowchart and write algorithm and write program for given scenario.

Mention all the inputs that you have experimented and outputs received. Also mention the correct alphanumeric password created by you.

Sr.No.	Inputs	Outputs
1.	Mention here the passwords used for wrong experiments	Password doesn't satisfy the constraints . Please try again later.
2.	Mention the passwords that gave you the correct validation	Good Password . You may continue and proceed ahead .

Algorithm

Step 1:- Start

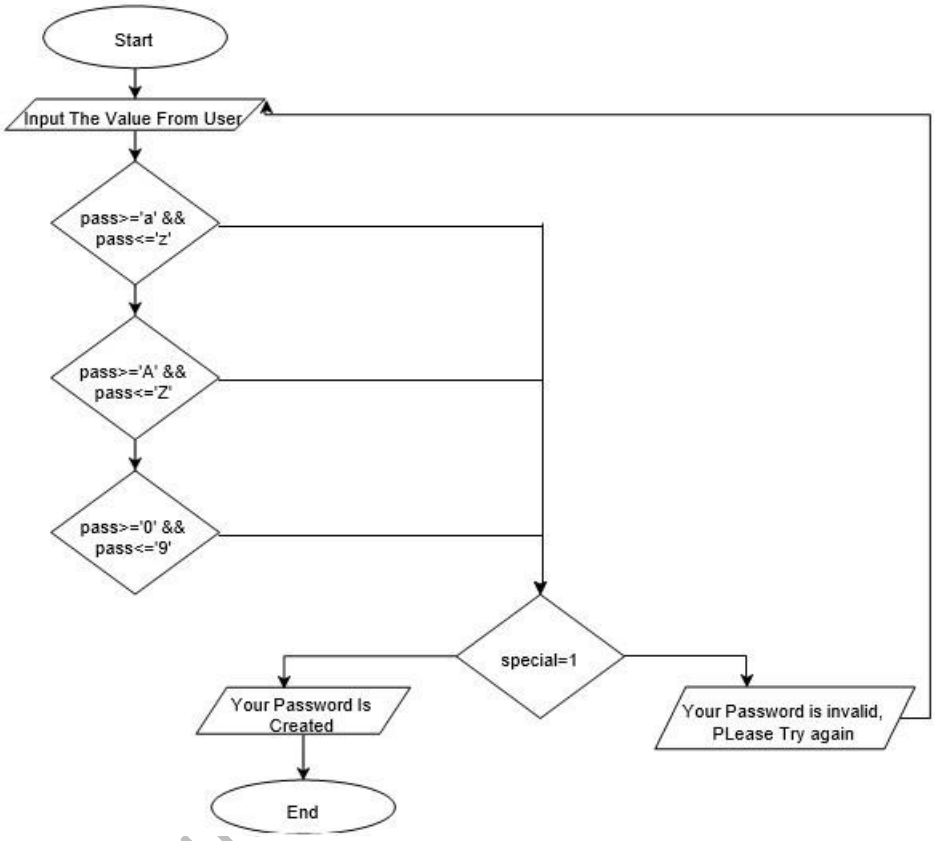
Step 2:- Input Value of pass from user

Step 3:- Check The Conditions

Step 4:- print output

Step 5:- End

Flowchart

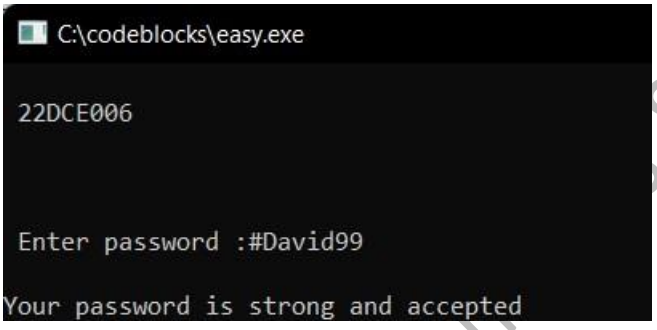


Code:-

```
#include<stdio.h>
int main()
{

char pass[10];
int i,small=0,capital=0,digit=0,special=0; L:
printf("\n 22DCE006 \n\n\n");

printf("\n Enter password :");
 scanf("%s",pass);
do
{
if(pass[i]>='a' && pass[i]<='z')
   small=1;
```

```
else if(pass[i]>='A' && pass[i]<='Z')
 capital=1;
else if(pass[i]>='0' && pass[i]<='9')
digit=1;
else
special=1; i++;
}while(pass[i]!='\0');

if(small==1 && capital==1 && digit==1 && special==0)
   printf("\nYour password is strong and accepted ");
else
{
printf("\nYour password is invalid ");

 goto L;
}
}
```

Output



Questions:

1. Have you understood working of do…while loop? Do mention the syntax of this loop.
   Ans:- Yes, do
   {
   statement(s); increment
   loop counter
   } while (condition);
2. Have you used for loop in this program?
   Ans:- Yes
3. What is goto statement? How is it useful?
   Ans:- The goto statement is a jump statement which is sometimes also referred to as unconditional jump statement. The goto statement can be used to jump from anywhere to anywhere within a function.

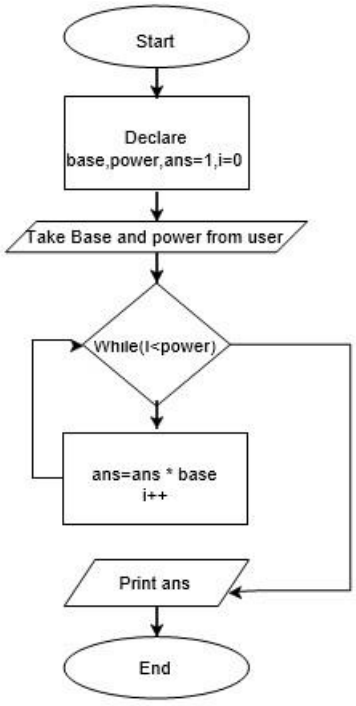
6.2	Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another. (Use While loop) **Expected Outcome:**

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Mention at least 3 different inputs that you have experimented and outputs received.

Sr.No.	Base Number	Power	Output
1.	2	2	4
2.	2	3	8
3.	2	4	16

Algorithm:-
Step 1:- Start
Step 2:- Input The Base And Power Form User
Step 3:- Calculate The Equation (ans*base) while power>0
Step 4:- print ans
Step 5:- End

Flowchart:-

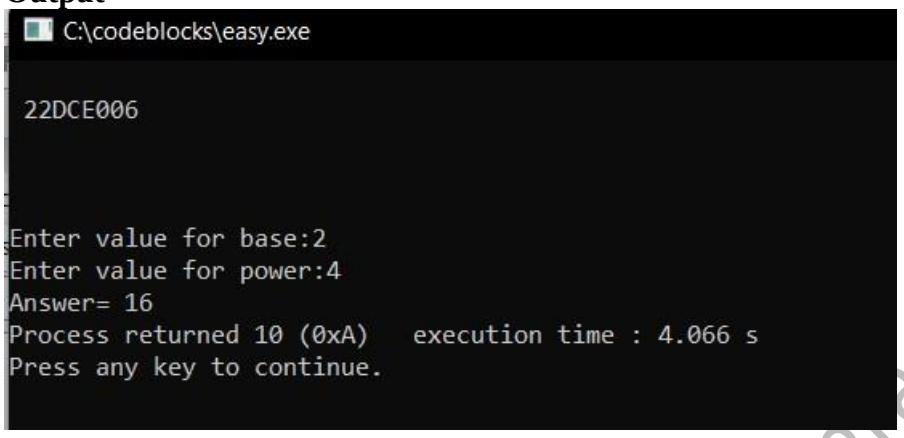


Code:-

```
#include<stdio.h>
void main()
{
int i,a,b,ans=1;
printf("\n 22DCE006 \n\n\n\n");

printf("Enter value for base:");scanf("%d",&a);
printf("Enter value for power:");scanf("%d",&b);
i=1;
while(i<=b)
```

```
{
ans=ans*a;i++;
}
printf("Answer= %d",ans);
}
```

Output



Questions:

1.Have you understood the concept of while loop? if yes write its syntax here.

Ans:-yes ,

```
while(condition)
{
    // body of the loop
}
```

6.3 Write a C program for Big bazaar cashier to count the amount to be collected from the customer. Cashier will enter the numbers one after another for each item and to get the summation of entered numbers, he has to enter 0. (Use for loop) (Hint: Break statement can be used)

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Mention at least 3 different inputs that you have experimented and outputs received.

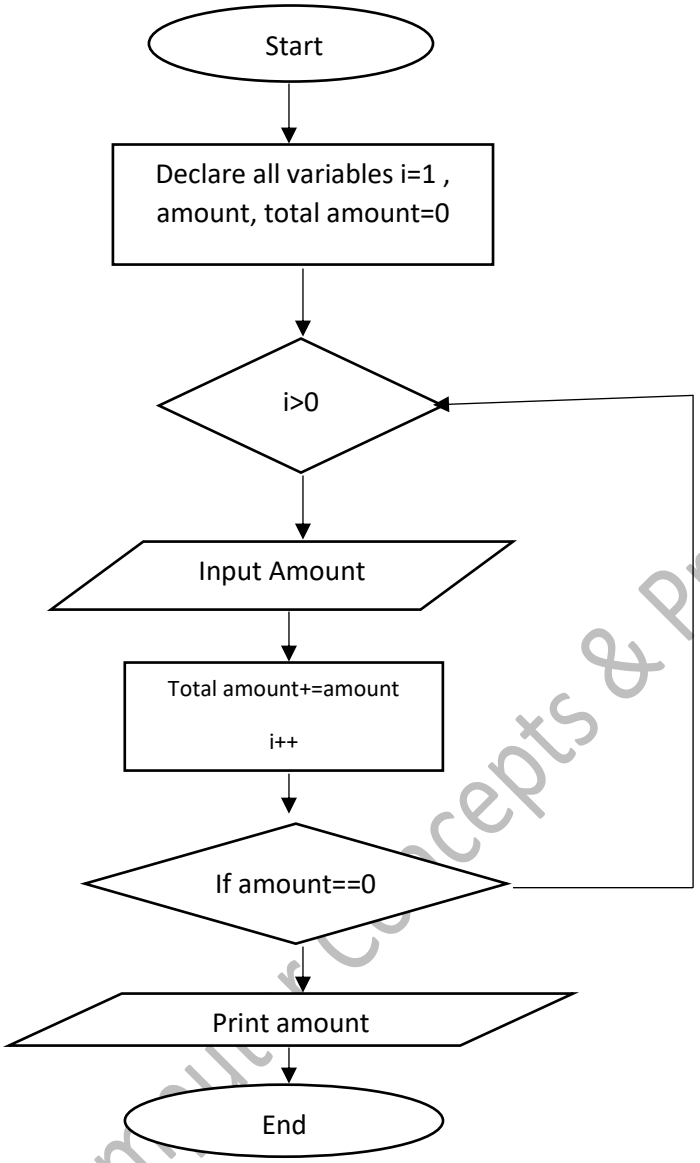
Sr.No.	Entered Number	Summation after entering 0
1.	50	50
2.	20	70
…	…	...
N	...	…

Algorithm:-

Step 1 : Start
Step 2 : Declare all variable i=1,amount,total amount=0
Step 3 : check if i>0 go to step 4
Step 4 : input amount from keyboard
Step 5 : total amount=total amount+amount and do i++

Step 6 : check If amount == 0 go to step 7 else go to step 3
Step 7 : Print total amount .
Step 8 : Stop

Flowchart

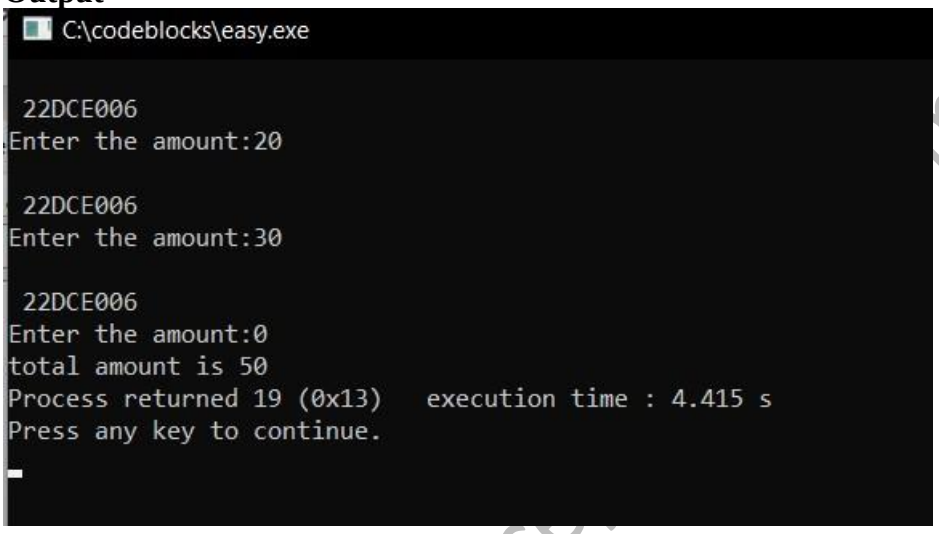


Code

```
#include<stdio.h>
 void main()
{
int sum=0,amt;
 for(  ; ; )
{
printf("\n 22DCE006 \n");
printf("Enter the amount:");
scanf("%d",&amt);
if(amt==0)
```

```
   {
   break;
   }
else
   {
      sum=sum+amt;
   }
}
   printf("total amount is %d ", sum);
}
```

Output



Questions:

1.Have you learned the concept of for loop using above given scenario? Explain what does 'i' stands for in the for() loop, consider the given example below.

E.g. for(i=0;i<10;i++)

Ans:- yes,for(i=1 ; i>0 ; i++) i stand variable iteration for syntax in for loop.

6.4

Write a program for a match-stick game between the computer and a user.

Your Program should ensure that the computer always wins. Rules for the games are as follows:

- There are 21 match-sticks.
- The computer asks the player to pick 1, 2, 3, or 4 match-sticks.
- After the person picks, the computer does its picking.
- Whoever is forced to pick up the last match-stick loses the game.

Use while loop, break and Continue Statements.

To understand the above game in a better way, visit the following link:

http://atozmath.com/Games/21MatchStick.aspx

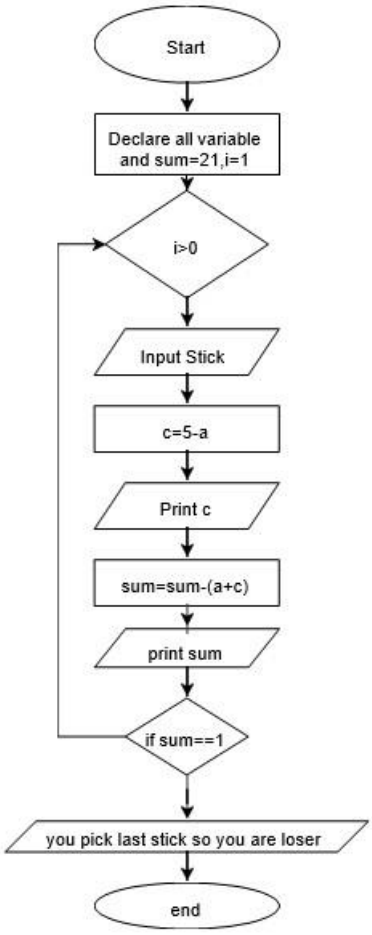
Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Write the sequence of sticks inputted by you and computer one after another.

Sr. No.	Entered Number by User	Entered Number by Computer	Sticks left
1.	4	1	21
2.	3	2	16
…	…	…	…
…	…	…	…
N.	…	0	…

Algorithm:
Step 1: Start.
Step 2: Declare variables : match_stick=21,player,comp,left=21.
Step 3: if left>0
Step 4: enter the value of 'player' in 1 to 4 from user.
Step 5: if 'player4 or player1 go to step 4
Step 6: left = left - player.
Step 7: comp=5-player.
Step 8: left = left - comp.
Step 9: if left==1,if true then print "you have lost",if false then continue the loop.go to step 3
Step 10: end.

Flowchart:-



Code

```
#include<stdio.h>
 void main()
{
int m=21,a,b,i; for(i=1;i<=4;i++)
{
printf("\n 22DCE006 \n\n ");
printf("Enter the no of match-sticks:");
scanf("%d",&a);
b=5-a;
printf("computer enter %d\n",b);
m=m-5;
   if(m==1)
   {
         printf("you pick last sticks\n");
        printf("YOU ARE LOSER !!!!!!");
   }
}
}
```

Output

Questions:

1. What is the significance of using break and continue statement?

Ans:- The break statement is used to terminate the loop immediately. The continue statement isused to skip the current iteration of the loop.

7.1 Twenty-five numbers are entered from the keyboard into an array. Write a C program to find out how many numbers of them are positive, negative, and how many are even and odd?

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Enter the counts of positive, negative, even and odd numbers in the below given table as per the output received.

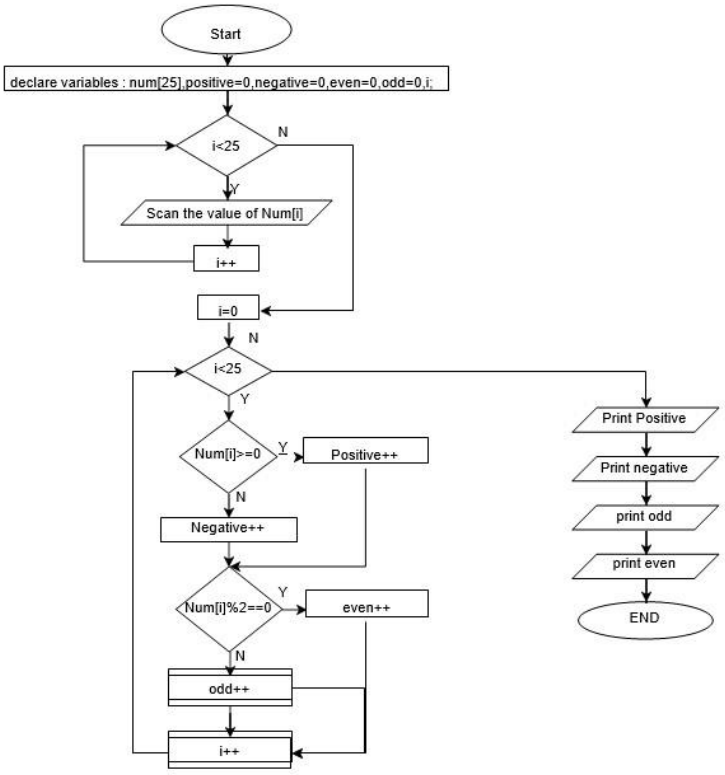
Sr. No.	Parameter	Counts
1.	Positive Numbers:	
2.	Negative Numbers:	
3.	Even Numbers:	
4.	Odd Numbers:	

Algorithm:

Step 1 : start.
Step 2 : declare variables : num[25],positive=0,negative=0,even=0,odd=0,i;
Step 3 : if i < 25 go to step 4.else go to step 7.
Step 4 : scan num[i];
Step 5 : i++
Step 6 : go to step 3.Step 7 : i=0.
Step 8 :if i<25 go to step 9.else go to step 13 .
Step 9 : if num[i]>=0 → positive++ else negative ++.go to step 10.
Step 10 : if num[i]%2==0 → even++. Else odd++.go to step 11.

Step 11 : i++
Step 12 : go to step 8.
Step 13 : print the numbers of positives,negatives,odd numbers and even numbers.
Step 14 : end.

Flowchart

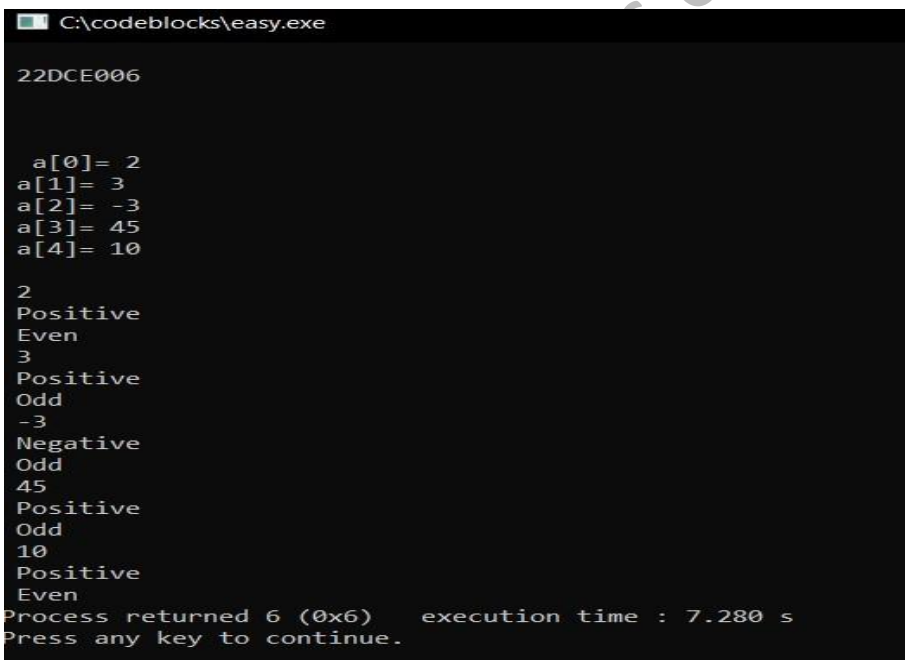


Code

```
#include<stdio.h>
void main()
{
      int a[25];
       int i;

      printf("\n 22DCE006 \n\n\n\n ");
       for(i=0 ; i<5 ; i++)
       {
          printf(" a[%d]= ",i);
          scanf("%d",&a[i]);

       }
       for(i=0 ; i<5; i++)
       {
          printf("\n %d",a[i]);
          if(a[i] > 0 )
          {
```

```
            printf("\n Positive ");
        }
        else
        {
            printf("\n\ Negative ");
        }

        if( a[i]%2==0)
        {
            printf("\n Even");
        }

        else

        {
            printf("\n Odd");
        }

    }

}
```

Output



Questions:

1.Is it necessary to initialize a variable with zero every time? If yes, then why? If No, then when is it necessary to initialize the number with zero and why?

Ans:-Because C doesn't automatically set it zero for you. So, you should initialize it Yourself, int c = 0 saw the Author of the course/tutorial zero-initialize a variable and started wondering.

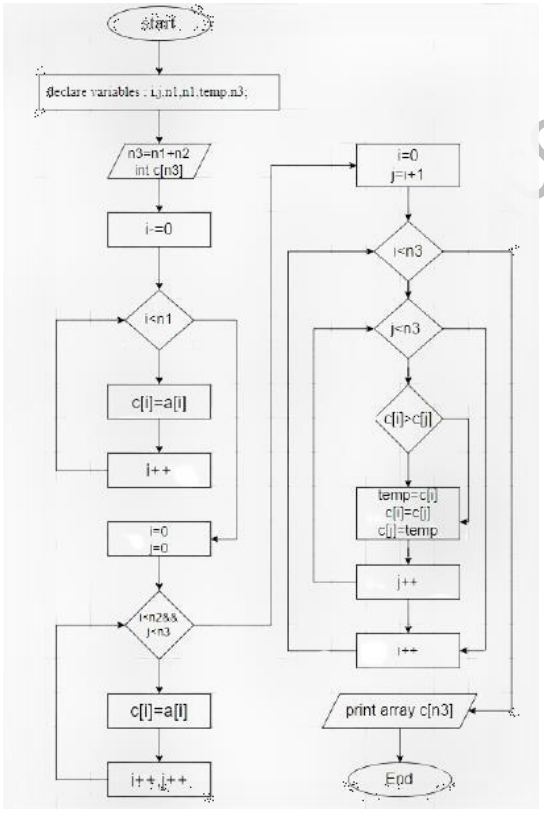
7.2 Write a program for creating two arrays of different size and merge both arrays into one by sorting those arrays in ascending order. [**Merge by sorting**].

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot ofoutput. Following screenshot showcases the expected outcome, you can enter the input values ofyour choice

```
enter size of A :4
enter A[1] : 2
enter A[2] : 5
enter A[3] : 7
enter A[4] : 9

enter size of B : 5

enter B[1] : 1
enter B[2] : 3
enter B[3] : 6
enter B[4] : 10
enter B[5] : 11

merge and sort of array A and B

 1  2  3  5  6  7  9  10  11
```

Flowchart



Algorithm

Step 1 : start.

Step 2 : Declare variables : i,j,n1,n2,temp,n3.

Step 3 : Scan the size of array a = n1 and size of array b=n2
Step 4 : Scan n1 elements of array a using for and Scan n2 elements of array b using for loop
Step 5 : n3=n1+n2,int c[n3]
Step 6 : i=0
Step 7 : if i<n1 goto step 8. Else go to step 10.
Step 8 : c[i] = a[i].
Step 9 : i++. Go to step 7.
Step 10 : i=0, j=0 .
Step 11 : if i<n2 && j<n3 go to step 12.else step 14 .Step
12 : c[j] = b[i] .
Step 13 : i++ , j++. Go to step 11.
Step 14 : i=0, j=i+1.
Step 15 : if i< n3. Go to step 16.else go to step 21.Step
16 : if j<n3 go to step 17. Else go to step 20. Step 17 :
if c[i] > c[j]. step 18.else go to step 19. Step 18 :
temp=c[i] ; c[i]=c[j] ; c[j]=temp;
Step 19 : j++.
Go to step 16.
Step 20 : i++.go to step 15.
Step 21 : print array c[n3] using for loop.
Step 22 : end.

Code

```
#include<stdio.h>
void main()
{
   int a[10] , b[10] , c[20] , i , j ,  n , m , temp ;

   printf(" \n 22DCE006 \n\n\n");
   printf("\n Enter size of first array : ");
   scanf("%d",&n);
   printf("\n Enter elements for first array : \n");
   for(i=0 ; i<n ; i++)
      {
         printf(" a[%d]= ",i);
         scanf("%d",&a[i]);
      }

   printf("\n Enter size of second array : ");
   scanf("%d",&m);
   printf("\n Enter elements for second array : \n");
   for(i=0 ; i<m ; i++)
      {
         printf(" b[%d]= ",i);
```

```
        scanf("%d",&b[i]);
    }

  for(i=0 ; i<n ; i++)
  {
    c[i] = a[i];
  }
  for(i=0 ; i<m ; i++)
  {
    c[i+n] = b[i];
  }


  printf("\n Final Merged Array of both above mentioned arrays is as follow: ");
   for(i=0 ; i<(m+n) ; i++)
    {
      printf("\n c[%d] = %d ",i,c[i]);

    }



    printf ("\n\n");
   printf (" ascending order is as follows \n\n");
  for(i=0 ; i<=(m+n) ; i++)
  {
    for(j=i+1 ; j<=(m+n) ; j++)
    {
      if(c[i] > c[j])
      {
        temp=c[i];
        c[i]=c[j];
        c[j]=temp;
      }
    }

  }

  for(i=0 ; i<=8 ; i++)
  {
    printf("\n%d ", c[i]);
  }

}
```

Output

```
C:\codeblocks\easy.exe

22DCE006



Enter size of first array : 4

Enter elements for first array :
a[0]= 1
a[1]= 2
a[2]= 3
a[3]= 4

Enter size of second array : 4

Enter elements for second array :
b[0]= 5
b[1]= 6
b[2]= 7
b[3]= 8

Final Merged Array of both above mentioned arrays is as follow:
c[0] = 1
c[1] = 2
c[2] = 3
c[3] = 4
c[4] = 5
c[5] = 6
c[6] = 7
c[7] = 8

ascending order is as follows


1
2
3
4
5
6
7
8
```

7.3

Write a Program to multiply any two 3*3 Matrices.

Test Data:

Input the rows and columns of first matrix: 3 3

Input the rows and columns of second matrix: 3 3

Expected Input and Output:

Draw flowchart, write algorithm and program for given scenario. Also attach screenshot ofoutput.

Input for first matrix:

	j[0]	**j[1]**	**j[2]**
i[0]	2	5	8
i[1]	3	6	9
i[2]	4	7	10

Input for Second Matrix:

	j[0]	**j[1]**	**j[2]**
i[0]	2	3	4
i[1]	9	7	6
i[2]	1	5	2

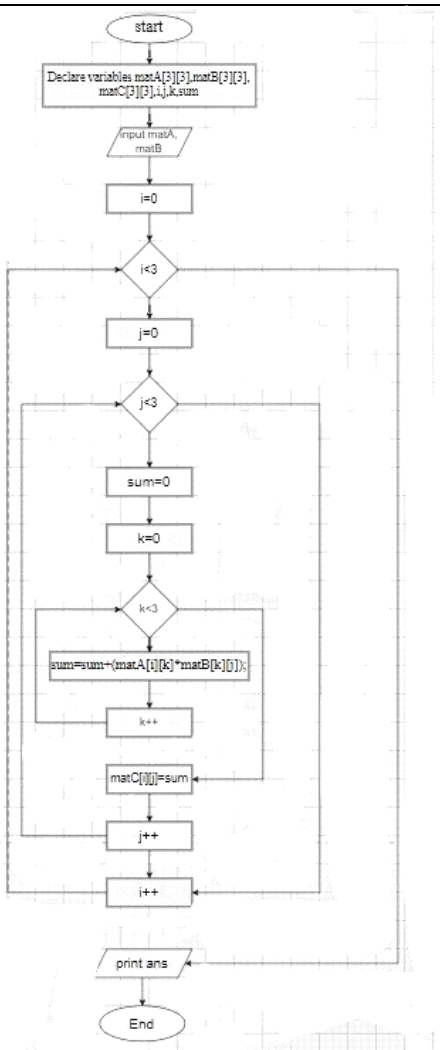
matrix multiplication data in the below given table as per the output received: **j[0] j[1] j[2]**

i[0]
i[1]
i[2]

Algorithm:

Step 1: Start
Step 2 : Declare variables matA[3][3],matB[3][3], matC[3][3],i,j,k,sum
Step 3 : Input the matA and matB using for loop.
Step 4 : i=0
Step 5 : if i<3 go to step 6. Else go to step 15.
Step 6 : j=0
Step 7 : if j<3 go to step 8.else go to step 14.
Step 8 : sum=0, k=0.
Step 9 : if k < 3 goto step 10.else go to step 12.
Step 10 : sum=sum+(matA[i][k]*matB[k][j]);
Step 11 : k++. Go to step 9.
Step 12 : matC[i][j]=sum;.
Step 13 : j++.go to step 7.
Step 14 : i++ . go to step 5.
Step 15 : Print multiplication matC using for loop
Step 16 : end.

Flowchart:-



Code

```
#include<stdio.h>
void main()
{
   int a[3][3];
   int b[3][3];
   int c[3][3];
   int i,j,k;

   printf("\n 22DCE006 \n\n\n ");
   printf("1st Array's elements: \n\n");
   for(i=0 ; i<3 ; i++)
   {
      for(j=0 ; j<3 ; j++)
      {
         printf("row %d'th and col %d'th element = ",i,j);
         scanf("%d",&a[i][j]);
      }

   }
```

```
 for(i=0 ; i<3 ; i++)
   {
      for(j=0;j<3;j++)
      {
         printf("%d\t",a[i][j]);
      }
      printf("\n");
   }

printf("2nd Array's elements: \n\n");
   for(i=0 ; i<3 ; i++)
   {
      for(j=0 ; j<3 ; j++)
      {
         printf("row %d'th and col %d'th element = ",i,j);
         scanf("%d",&b[i][j]);
      }

   }


 for(i=0 ; i<3 ; i++)
   {
      for(j=0;j<3;j++)
      {
         printf("%d\t",b[i][j]);
      }
      printf("\n");
   }


   printf("\n\n");
   printf("Result of Multiplication of two Matrices is:  \n\n");

   for(i=0 ; i<3 ; i++)
   {
      for(j=0 ; j<3 ; j++)
      {
         c[i][j]=0;
         for(k=0 ; k<3 ; k++)
         {
               c[i][j]=c[i][j] + a[i][k]*b[k][j];

         }


      }

   }
```

```
   for(i=0 ; i<3 ; i++)
   {
      for(j=0 ; j<3 ; j++)
      {
         printf("%d\t",c[i][j]);

      }
   printf("\n");
   }


}
```

Output

```
C:\codeblocks\easy.exe

 22DCE006


 1st Array's elements:

row 0'th and col 0'th element = 1
row 0'th and col 1'th element = 2
row 0'th and col 2'th element = 3
row 1'th and col 0'th element = 4
row 1'th and col 1'th element = 5
row 1'th and col 2'th element = 6
row 2'th and col 0'th element = 7
row 2'th and col 1'th element = 8
row 2'th and col 2'th element = 9
1       2       3
4       5       6
7       8       9
2nd Array's elements:

row 0'th and col 0'th element = 1
row 0'th and col 1'th element = 2
row 0'th and col 2'th element = 3
row 1'th and col 0'th element = 4
row 1'th and col 1'th element = 5
row 1'th and col 2'th element = 6
row 2'th and col 0'th element = 7
row 2'th and col 1'th element = 8
row 2'th and col 2'th element = 9
1       2       3
4       5       6
7       8       9


Result of Multiplication of two Matrices is:

30      36      42
66      81      96
102     126     150
```

Questions:

1. State the advantages of using Array Indexes. When is it suitable to take array index?

Ans:-In an array, accessing an element is very easy by using the index number. The search processcan be applied to an array easily. 2D Array is used to represent matrices. For any reason a user wishes to store multiple values of similar type then the Array can be used and utilized efficiently.

8.1

Help user to identify how strong is his password based on the number of lowercase alphabets, uppercase alphabets, digits and special characters given by the user from the keyboard. Lengthof entered password(string) should be of 8.

Constraints for identifying strength of password:

1. Strong: Mixture of lowercase alphabets, uppercase alphabets, digits and special characters

2. Average: Mixture of lowercase alphabets, digits and special characters

3. Poor: Either only has alphabets/digits/special characters

Algorithm:

Step 1: Start

Step 2 : Declare variables u=0,l=0,s=0,n=0,j=0,password[8];

Step 3 : enter the password.

Step 4 : i=0 check password[i]!=0 if no than check isuppre if yes than u=u+1

Step 5 : check islower else if yes than l=l+1. check isdigit else if yes than d=d+1.else s=s+1.

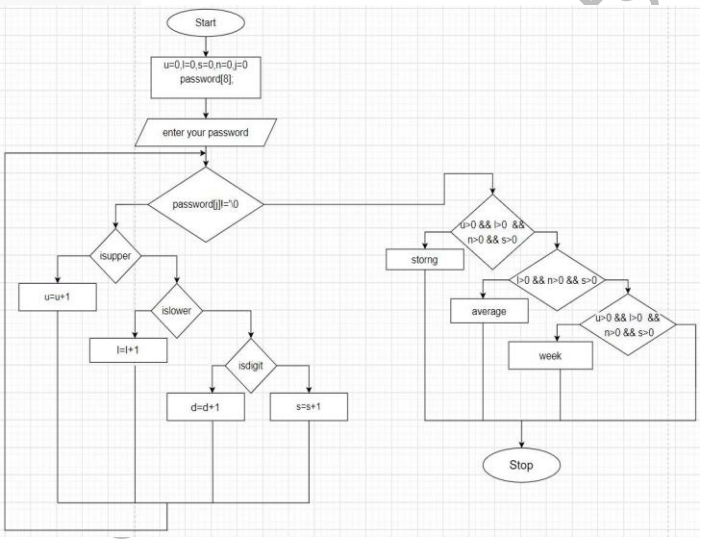
Step 6 : check all condition and check incriment

Step 7 : if u>0 && l>0 && n>0 && s>0 than print strong.Step 8 : else if l>0 && n>0 && s>0than print average.

Step 9 : else if s>0 || l>0 || n>0 || u>0than print week.

Step 10 : stop

Flowchart



Code

```
#include<stdio.h>
int main()
{
int u=0,l=0,s=0,n=0,w=0,j;
char password[8];
printf("\n 22DCE006 \n\n\n");
```

```
printf("enter your password:");
        scanf("%s",&password);
        for(j=0;password[j]!='\0';j++)
{
   if(isupper(password[j]))
{
u++;
}
else if(islower(password[j]))
{
l++;
}
else if(isdigit(password[j]))
{
n++;
}
else
{
s++;
}
}
if(u>0 && l>0  && n>0 && s>0)
{
printf("strong\n");
}
else if(l>0 && n>0 && s>0)
{
printf("average\n");
}
else if(s>0 || l>0 || n>0 || u>0)
{
printf("weak\n");
}
else
{
printf("try again!! your pass is wrong\n");
}
return 0;
}
```

Output

```
C:\codeblocks\easy.exe

22DCE006


enter your password:Hello@22
strong

Process returned 0 (0x0)   execution time : 10.264 s
Press any key to continue.
```

Questions:

1. Explain the difference between string and character. Also write the syntax for printing character and string.

Ans: The main difference between Character and String is that Character refers to a single letter, number, space, punctuation mark or a symbol that can be represented using a computer while String refers to a set of characters. In C programming, we can use char data type to store both character and string values. A string is a sequence of characters terminated with a null character \0 . ... For example: char z[] = "z string"; A characters is terminated with a null character \0 .

8.2

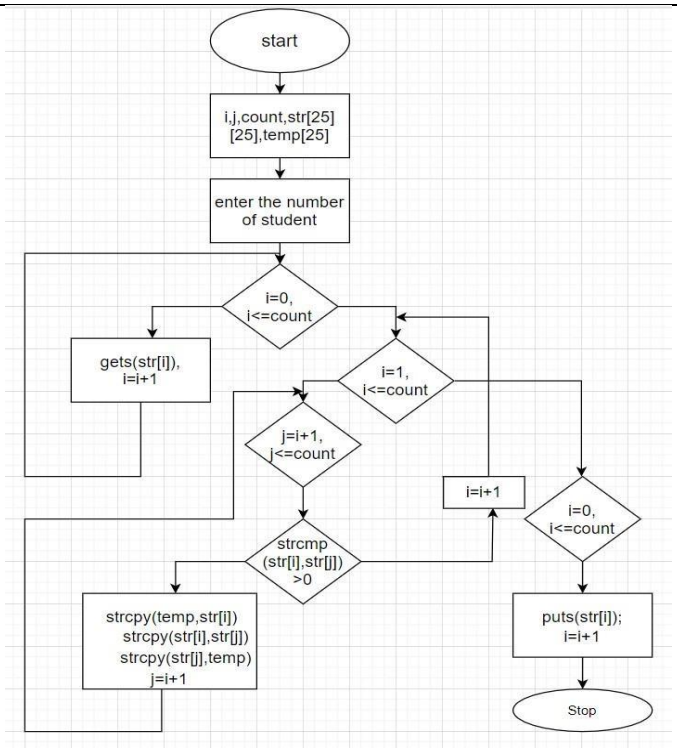
Let us assume, teacher is supposed to allot seats based on the student's names. You are requestedto help teacher by creating a C program, for collecting the names of 5 students and sort them in alphabetical order.

Hint: Use string functions, use **fgets** function to collect the names of students.

Algorithm:

Step 1: Start
Step 2 : Declare variables i,j,count,str[25][25],temp[25]
Step 3 : enter the number of student
Step 4 : i=0 check i<=count if yes than get name of student
Step 5 :i=1 else if check i<=count yes then j=i+1 check j<=count .
Step 6 : check strcmp(str[i],str[j])>0 if yes then swap else i=i+1.
Step 7 :i=0, check i<=count yes then print string
Step 8 : stop

Flowchart

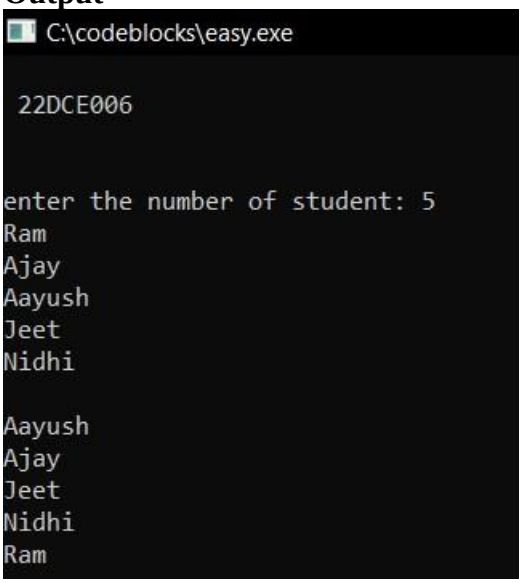


Code

```
#include<stdio.h>
 #include<string.h>
 int main()
{
int i,j,count;
char str[10][10],temp[25];
 printf("\n 22DCE006 \n\n\n");

 printf("enter the number of student: ");
 scanf("%d",&count);
 for(i=0;i<=count;i++)
{
gets(str[i]);
}
for(i=1;i<=count;i++)
{
for(j=i+1;j<=count;j++)
{
if(strcmp(str[i],str[j])>0)
{

strcpy(temp,str[i]);
strcpy(str[i],str[j]);
strcpy(str[j],temp);

}
}
```

```
}
for(i=0;i<=count;i++)
{
puts(str[i]);
} return 0;
}
```

Output



Questions:

1. Which string functions have you learned from this program? Explain any 5 string functionsin below given table.

Sr.No.	Input of names	Sorted Output as per Input
1.	Strlen(a)	To find string length
2.	Strcpy(a)	Copy string to another string
3.	Strcat(a)	Concatenation of string
4.	Strcmp(a)	Comparing 2 strings
5.	Strrev(a)	To Reverse a string

9.1

Write a C program to check if the entered number is prime or not by using types of user defined functions
(i) No arguments passed and no return value
(ii) No arguments passed but a return value
(iii) Argument passed but no return value
(iv) Argument passed and a return value

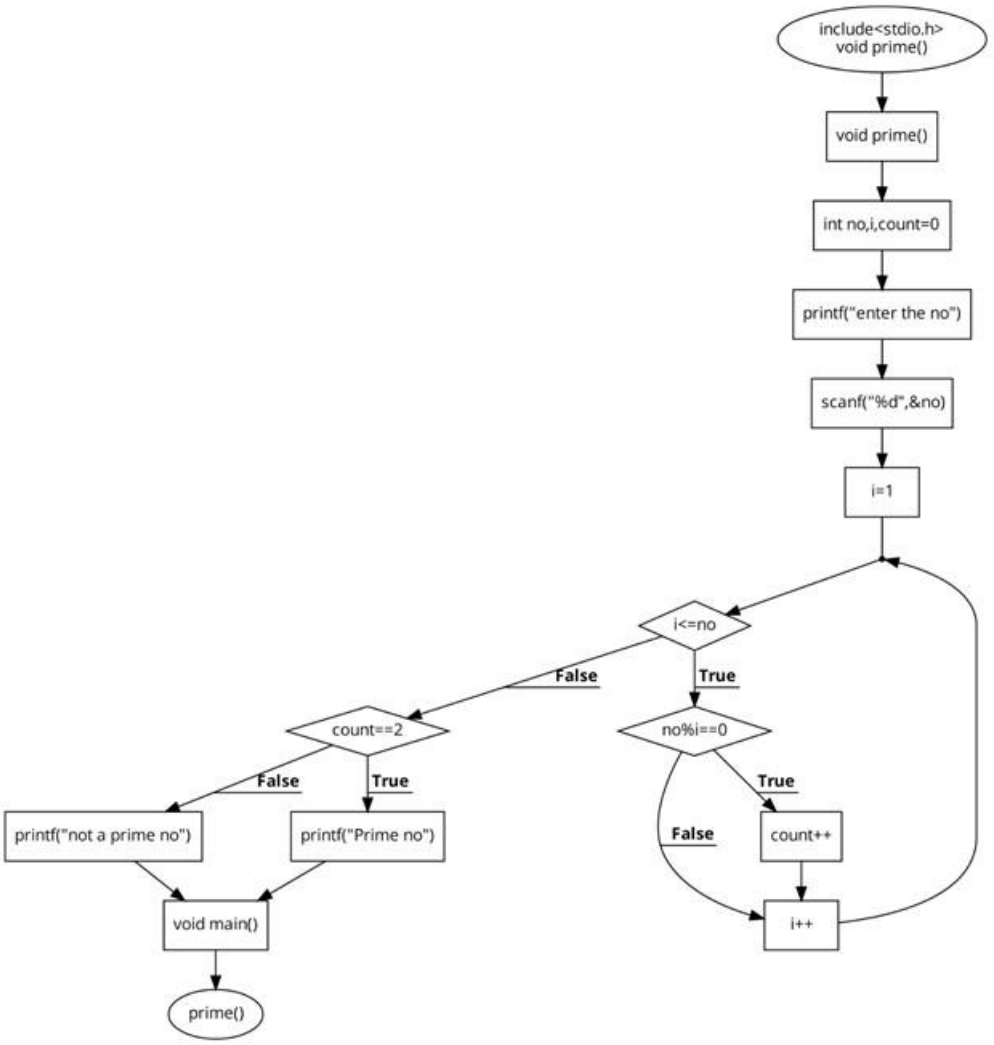
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach a screenshot ofthe output.

Enter the details into the table based on the inputs entered by you and tick mark the column, whether the inputted value is prime or non-prime:

Algorithm:

Step1: start
Step2: enter number, count==0, i=0
Step3:call function
Step4: check no % I==0 if trueCount++;
until I<=no
Step5: if false then check count==2 if trueThen number is prime
Step6: if false then number is not a prime.
Step7: stop

Flowchart

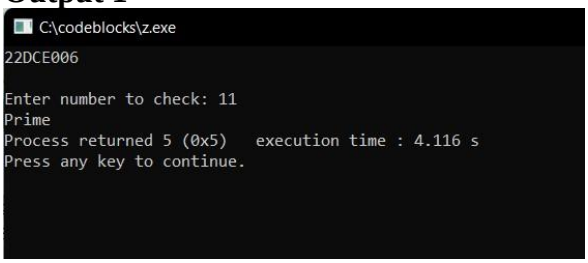


Code 1:

```
#include<stdio.h>
void prime_check()
{
   int i , n;
   printf("Enter number to check: ");
   scanf("%d",&n);
   if(n==1)
   {
      printf("Neither prime nor composite ");
   }
   else
   {
      for(i=2 ; i<=n ; i++)
      {
         if(n%i==0)
            break;
         else
            continue;
```

```
        }
        if(i!=n)
            printf("Not prime");
        else
            printf("Prime");
    }
}
void main()
{

    printf("22DCE006\n\n");
    prime_check();
}
```

Output 1

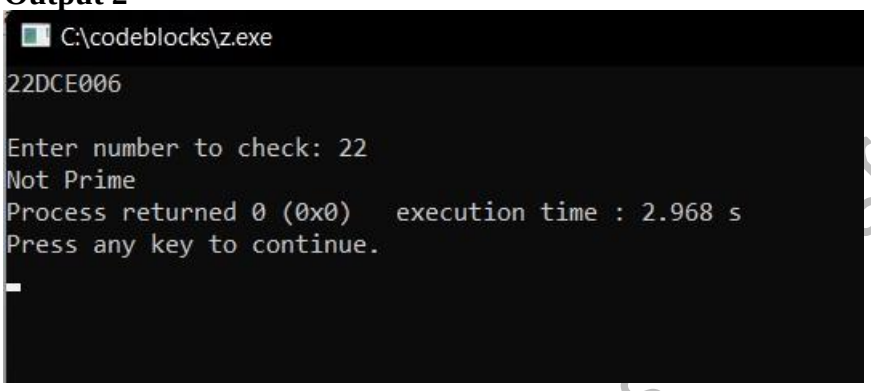


Code 2

```
#include<stdio.h>
int prime_check3();
main()
{
    int a ;
    printf("22DCE006\n\n");
    a=prime_check3();
    if(a==0)
        printf("Neither prime nor composite");
    else if(a==1)
        printf("Not Prime");
    else if(a==2)
        printf("Prime");
}

int prime_check3()
{
    int n , i;
    printf("Enter number to check: ");
    scanf("%d",&n);
    if(n==1)
    return 0;

    else
    {
        for(i=2 ; i<n-1 ; i++)
```

```
    {
      if(n%i==0)
        break;
      else
        continue;
    }
    if(i!=n)
      return 1;
    else
    return 2;
  }
}
```

Output 2

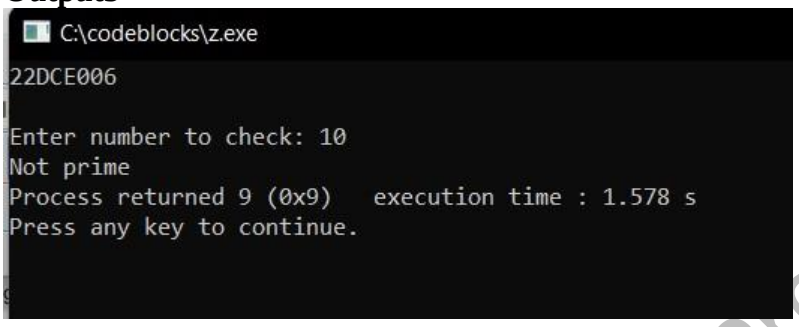


Code 3

```
#include<stdio.h>
void prime_check2(int n );
void main()
{
  int n;
  printf("22DCE006\n\n");
  printf("Enter number to check: ");
  scanf("%d",&n);
  prime_check2(n);

}
void prime_check2(int j)
{
  int i ;
  if(j==1)
    printf("Number is neither prime nor composite");
  else
  {
    for(i=2 ; i<=j-1 ; j++)
    {
      if(j%i==0)
        break;
      else
        continue;
```

```
    }


  if(i!=j)
    printf("Not prime");
  else
    printf("Prime");
  }

}
```

Output3

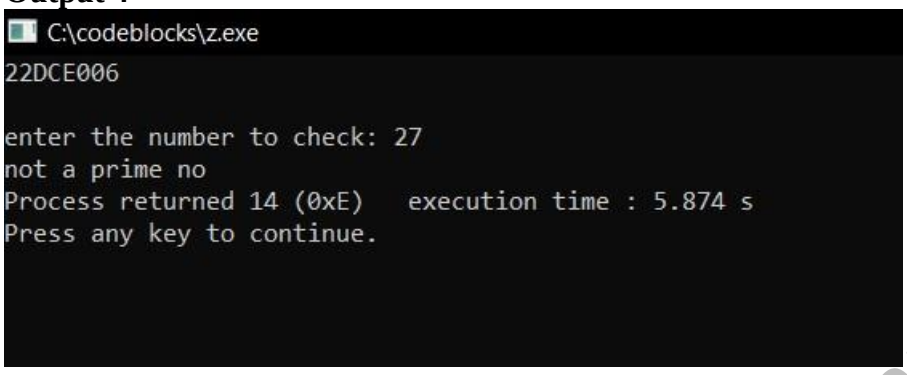


Code 4

```
#include<stdio.h>
int prime(n)
{
  int num,a,i,count=0;
  printf("22DCE006\n\n");
  printf("enter the number to check: ");
  scanf("%d",&n);

  for(i=1;i<=n;i++)
  {
    if(n%i==0)
    {
      count++;
    }
  }
  return count;

}

void main()
{

    int a;
    a=prime();
    if(a==2)
    {
      printf("Prime no");
    }
```

```
    else
    {
       printf("not a prime no");
    }
}
```

Output 4



Question :

1. You might be clear now, how user defined functions are created in different ways. Explain them.

- Element of user defined function
- 1. Function definition
- 2. Function call
- 3. Function declaration

- User defined function created in 5 different ways
- 1. No argument no return value
- 2.no argument with return value
- 3.with argument no return value
- 4.with argument with return value

9.2 Verify the triangle, if the length of the sides of a triangle are denoted by a, b and c, then the area of triangle is given by:

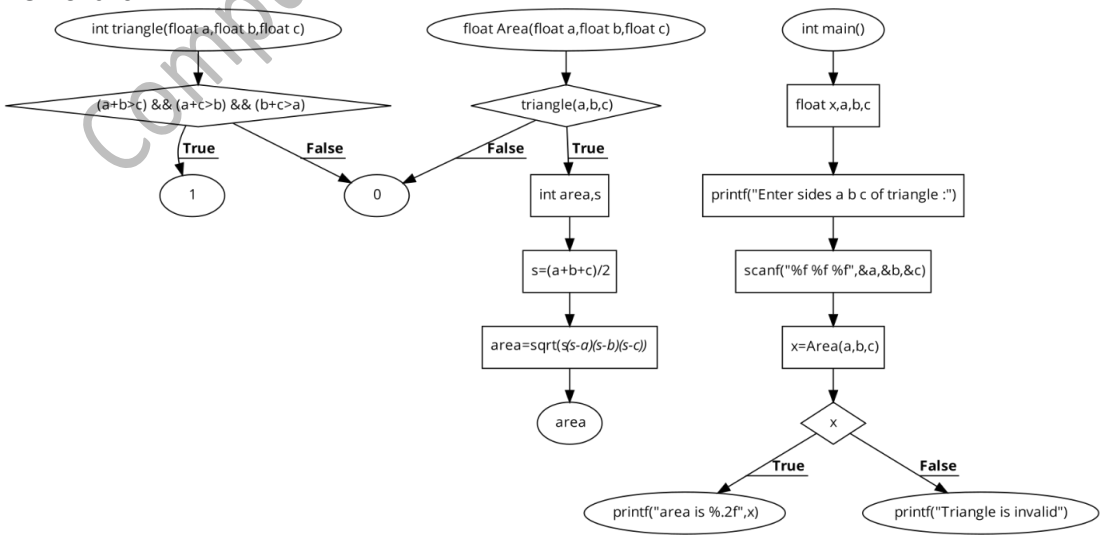
s=a+b+c/2
A=sqrt[(s)*(s-a)*(s-b)*(s-c)]

Use nested function.
Collect the values for a, b and c from user for identifying whether it forms Triangle or not.
Expected Outcome:
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.
Enter the inputs for verifying triangle and mention the results in the below mentioned table format. Tick mark whether based on input, triangle is formed or not.

Sr. No.	Input			Forming Triangle	Not a Triangle
	a	b	c		
1.					
2.					
3.					

Algorithm:
Step1: Start
Step2: Input a,b,c.
Step 3: Calculate s = (a + b + c) / 2.
Step4: Calculate area = sqrt(s*(s-a)*(s-b)*(s-c))
Step5: print "Area of Triangle=", area.
Step6: End.

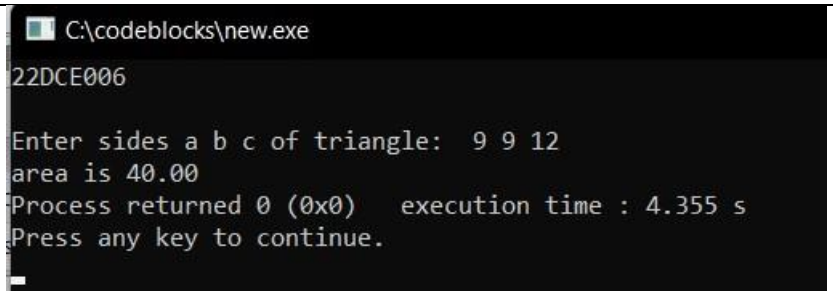
Flowchart



Code:-

```
#include<stdio.h>
#include<math.h>
int triangle(float a,float b,float c)
   {
      if((a+b>c) && (a+c>b) && (b+c>a))
      {
         return 1;
      }
      else
      {
         return 0;
      }
   }

float Area(float a,float b,float c)
{
    if(triangle(a,b,c))
      {
         int Area,s;
         s=(a+b+c)/2;
         Area=sqrt(s*(s-a)*(s-b)*(s-c));
         return Area;
      }

   else
   {
      return 0;
   }
}


int main()
{
   float x,a,b,c;
   printf("22DCE006\n\n");
   printf("Enter sides a b c of triangle:  ");
   scanf("%f %f %f",&a,&b,&c);
   x=Area(a,b,c);

   if(x)
   {
      printf("area is %.2f",x);
   }
   else
   {
      printf("Triangle is invalid");
   }
}
```

Output



Question :

1. Explain the concept of nested functions in C.

Ans-A function inside an another function is known as "nested function". But the reality is that it is not a nested function, it is treated as lexical scoping. Lexicalscoping is not valid in C because the compiler can't reach/find the correct memory location of the inner function.
Nested function is not supported by C because we cannot define a function withinanother function in C. We can declare a function inside a function, but it's not a nested function.
Because nested functions definitions can't access local variable of the surroundingblocks, they can access only global variables of the containing module. This is done so that lookup of global variables doesn't have to go through the directory.
As in C, there are two nested scopes: local and global .Therefore, nested functions have only a limited use. If we try to approach nestedfunction in C, then we will get compile time error.

9.3

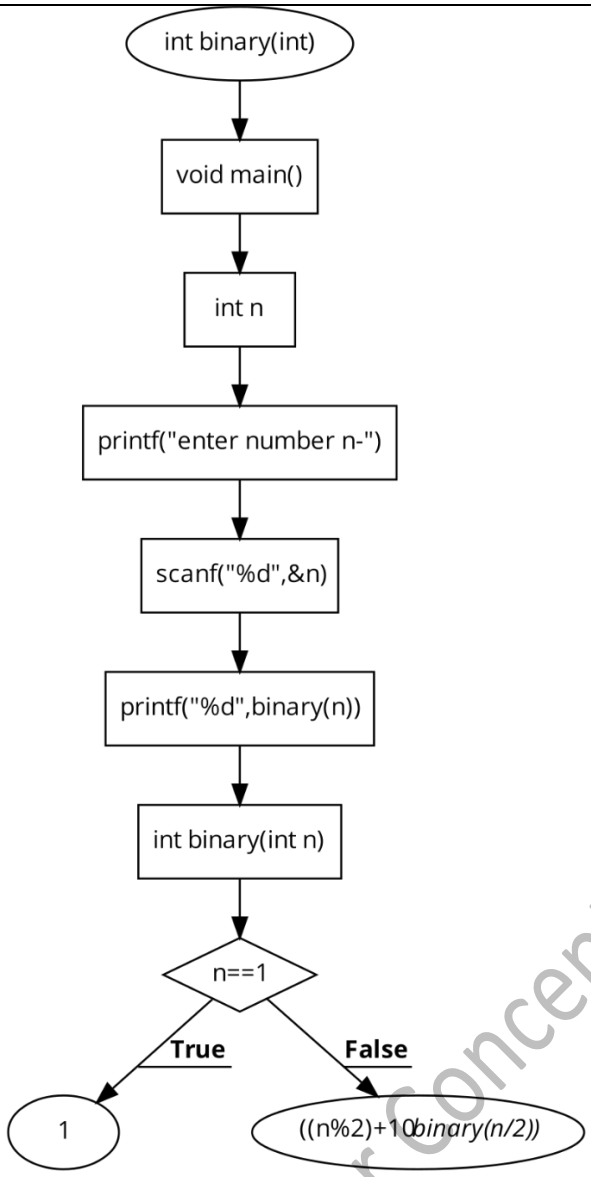
A positive integer is entered through the keyboard, write a function to find the binary equivalent of this number using recursion. Expected Outcome: Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Enter the inputs for converting the number into binary form, try it for three different inputs and fill the below given table:

Sr. No.	Input	Binary
1.		
2.		
3.		

Algorithm

Step1: Start
Step2: Take input of decimal from the user.
Step3: if (num == 0) then return value as 0.
Step4: if(num !=0) then return (num % 2) + 10 * binary_conversion(num / 2);
Step5: Stop

Flowchart



Code

```
#include<stdio.h>
int binary (int n )
  {
    if(n==1)
    {
      return 1;
    }

    else
    {
      return (n%2)+((10)*binary(n/2));
    }
```

```
   }
void main()
{
   int n;
   printf("22DCE006\n\n");
   printf("Please Enter the number for its binary form: \n");
   scanf("%d",&n);
   printf("%d",binary(n));



   printf("\n\nThank You \n\n ");
}
```

Output

```
C:\codeblocks\new.exe
22DCE006

Please Enter the number for its binary form:
12
1100

Thank You
```

Questions: Mention the advantages of using recursion in a program.

Ans--> The code may be easier to write.

- To solve such problems which are naturally recursive.
- Reduce unnecessary calling of function.
- Extremely useful when applying the same solution.
- Recursion reduce the length of code.
- It is very useful in solving the data structure problem.

10.1 Write a C program to create a structure of Book Detail and display the details of the book in appropriate format by passing structure as a function argument.
Book Detail must contain following information:
Book Title, Author name and Amount of book in float.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach a screenshot of the output.

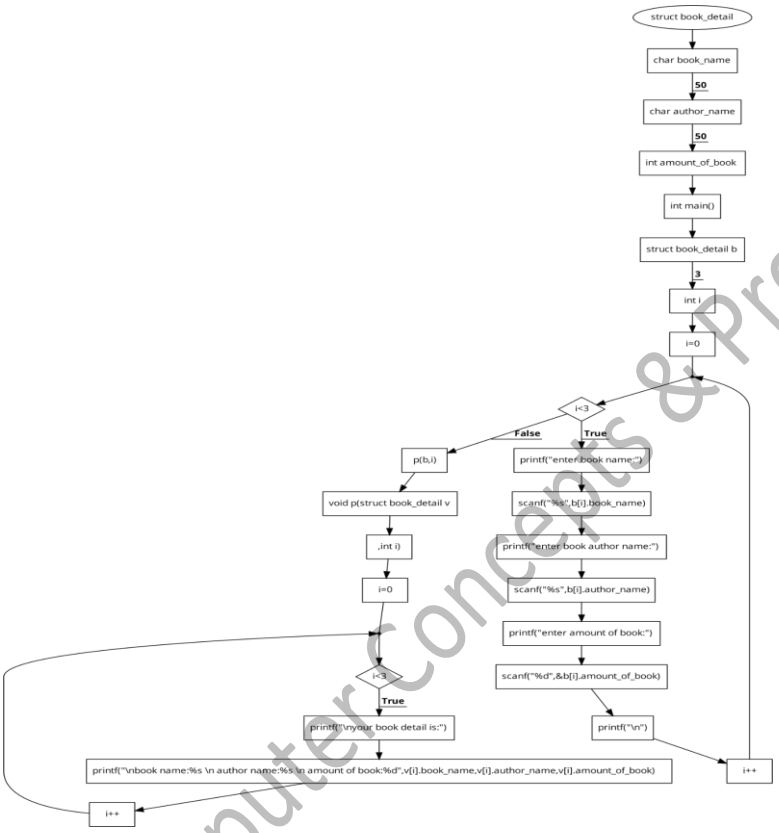
Enter the inputs for converting the number into binary form, try it for three different inputs and fill the below given table:

Sr. No.	Book Title	Author Name	Amount of book
1.			
2.			
3.			

Algorithm:

Step 1: Start
Step 2: Declare a structure (book) which consists details of book(With Member's name, author , price)
Step 3: Take input from user(Name of book, author, price)
Step 4: Print book details
Step 5:Stop

Flowchart

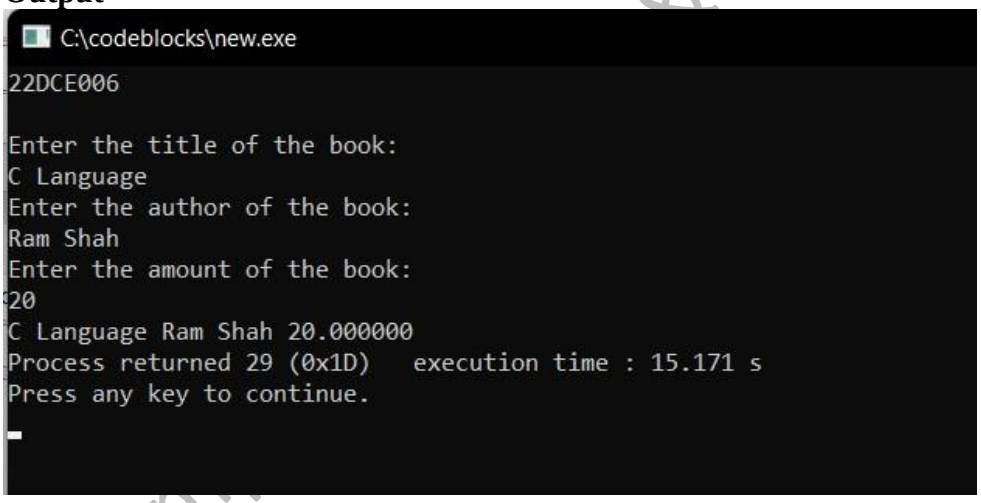


Code

```
#include<stdio.h>
struct book
{
   char title[20];
   char author[20];
   float amount;
};

 void display(struct book z)
 {
```

```
    printf("%s %s %f",z.title , z.author , z.amount);
 }



void main()
{
   struct book z;
   printf("22DCE006\n\n");
   printf("Enter the title of the book: \n");
   gets(z.title);

   printf("Enter the author of the book: \n");
   gets(z.author);

   printf("Enter the amount of the book: \n");
   scanf("%f",&z.amount);

   display(z);

}
```

Output



Question : Can we declare function inside structure of C Programming? Explain Why?

Ans: No, we cannot define a function within a struct in C. we can have afunction pointer in a struct though but having a function pointer is very different from a member function in C, namely there is no implicit this pointer to the containing struct instance.

10.2	Create a Union called library to hold accession number, title of the book, author name, price of the book and flag indicating whether the book is issued or not. (flag = 1 if the book is issued, flag = 0 otherwise). Write a program to enter data from one book and display the data. **Expected Outcome:**

Draw flowchart, write algorithm and program for given scenario. Also attach a screenshot of the output.

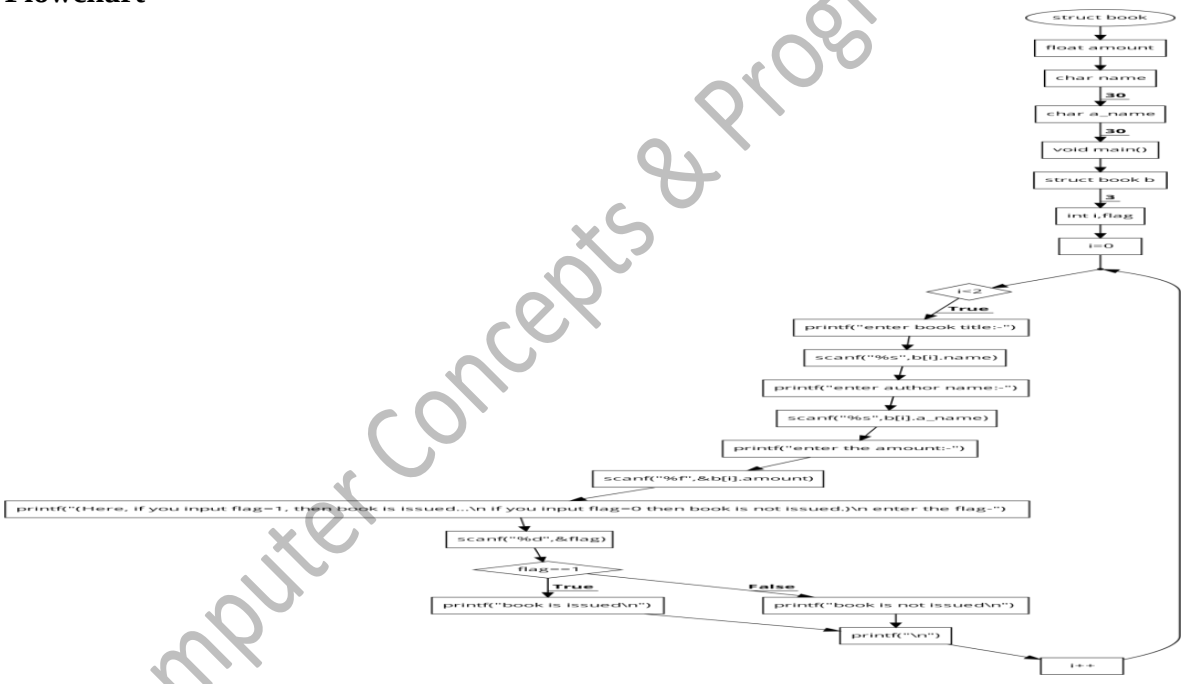
Enter the inputs for collecting the details for library books. Here, if user inputs flag=1, then bookis issued else book is not issued.

Sr. No.	Accession Number	Title of Book	Author	Price	Flag	Output
1.						Book Issued
2.						Book Not Issued

Algorithm:

Step 1: Start
Step 2: Declare a union with members holding character value ,float and integer value.
Step 3: Declare union variables a1,a2,f.
Step 4: Take input from the user and store it in union variables.member according to requirement.
Step 5: Check the flag using ' if ' condition(if flag is equal to 1 then book is issued).
Step 6: Stop

Flowchart



Code

```
#include<stdio.h>
 #include<string.h>

union book
{
float amount;
char name[30];
char a_name[30];
float acs_num;
};
void main()
```

```
{
union book b[4];
int i,flag;
printf("22DCE006\n\n");
for(i=0;i<2;i++)
{
printf("\n enter book title:- ");
scanf("%s",&b[i].name);

printf("\n");

printf("\n enter the accession number:- ");
scanf("%f",&b[i].acs_num);

printf("\n");

printf("\n enter author name:- ");
scanf("%s",&b[i].a_name);

printf("\n");

printf("\n enter the amount:- ");
scanf("%f",&b[i].amount);

printf("\n");

printf("(Here, if you input flag=1, then book is issued...\n if you input flag=0 then book is not
issued.)\n enter the flag-");
scanf("%d",&flag);

 if(flag==1)
{
printf("book is issued\n");
}
else{
printf("book is not issued\n");
}
printf("\n");
}
}
```

Output

```
C:\codeblocks\z.exe
22DCE006


 enter book title:- CLanguage


 enter the accession number:- 2200288292


 enter author name:- Balaguruswamy


 enter the amount:- 12

(Here, if you input flag=1, then book is issued...
 if you input flag=0 then book is not issued.)
 enter the flag-1
book is issued


 enter book title:- Clanguage


 enter the accession number:- 3883772892992


 enter author name:- Ramesh


 enter the amount:- 33

(Here, if you input flag=1, then book is issued...
 if you input flag=0 then book is not issued.)
 enter the flag-0
book is not issued


Process returned 10 (0xA)   execution time : 31.745 s
Press any key to continue.
```

Questions:

1. Explain the major difference between structure and union in detail.

Ans: The major difference between structure and union about their memory allocation. Into the structure each member has its own memory location that's why we can easily access each member at a time but in a union all the members are located at same memory location and total allocated memory is highest memory in the ram. that's why we cannot get individual access for the each component

10.3	Write a C program for collecting and displaying employee details such as, Age, Name, Address and Salary by using nested structure.

Expected Outcome:

Draw flowchart, write algorithm and program for given scenario. Also attach a screenshot of the output.

Algorithm :

Step 1: Start

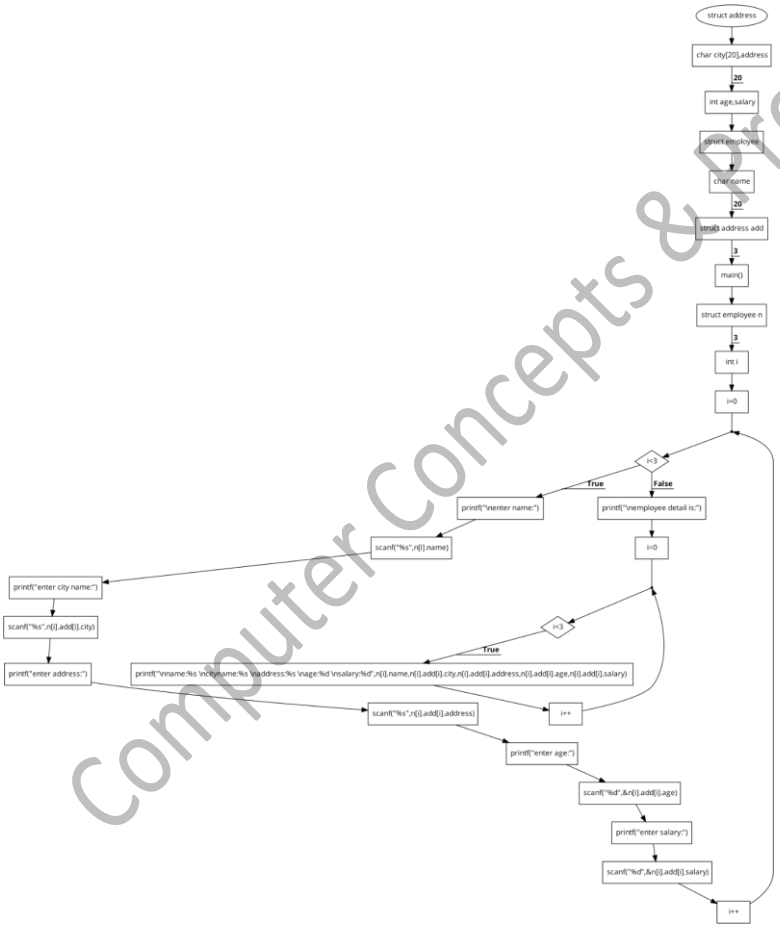
Step 2: Declare a structure (employee) which consists details of employee
(With Membrers -name, address , salary, age)

Step 3: Take input from user.

Step 4: Print employee detail

Step 5:Stop

Flowchart



Code

```
#include<stdio.h>
struct address
```

```
{ char city[20],address[20]; int age,salary
};

struct employee

{

char name[20];

struct address add[3];

};

main()

{
   printf("22DCE006\n\n");

struct employee n[3]; int i; for(i=0;i<3;i++)
{

printf("\nenter name:");
scanf("%s",n[i].name);
printf("enter city name:");
 scanf("%s",n[i].add[i].city);
  printf("enter address:");
  scanf("%s",n[i].add[i].address);
  printf("enter age:");
  scanf("%d",&n[i].add[i].age);
  printf("enter salary:");
  scanf("%d",&n[i].add[i].salary);
}

printf("\nemployee detail is:");
 for(i=0;i<3;i++)
{


   printf("\n name:%s ",n[i].name);
   printf("\n city name:%s ",n[i].add[i].city);
   printf("\naddress:%s",n[i].add[i].address);
   printf("\nage:%d",n[i].add[i].age);
   printf("\nsalary:%d",n[i].add[i].salary);



}

}
```

Output

```
C:\codeblocks\z.exe
22DCE006


enter name:ram
enter city name:baroda
enter address:manjalpur
enter age:19
enter salary:1500000

enter name:shyam
enter city name:baroda
enter address:makarpura
enter age:19
enter salary:1400000

enter name:david
enter city name:baroda
enter address:alkapuri
enter age:19
enter salary:1600000

employee detail is:
 name:ram
 city name:baroda
address:manjalpur
age:19
salary:1500000
 name:shyam
 city name:baroda
address:makarpura
age:19
salary:1400000
 name:david
 city name:baroda
address:alkapuri
age:19
salary:1600000
Process returned 0 (0x0)   execution time : 54.387 s
Press any key to continue.
```

Questions:

Explain how nested structure works in C programming.

1. Nested structure in C is nothing but structure within structure. One structure canbe declared inside other structure as we declare structure members inside a structure.
2. The structure variables can be a normal structure variable or a pointer variable toaccess the data. You can learn below concepts in this section.
3. Structure within structure in C using normal variable
4. Structure within structure in C using pointer variable

11.1 Write a program to read the marks of 10 students for the subject CE143 Computer concepts and Programming and computes the number of students in categories FAIL, PASS, FIRST CLASS and DISTINCTION using Pointers and Arrays.

Marks	Categories
70 or above	DISTINCTION
69 to 60	FIRST CLASS
59 to 40	PASS
Below 40	FAIL

For example, if following marks of 10 students are entered:
34 56 78 98 12 31 67 75 91 23
Then the output should be
DISTINCTION 4 FIRST CLASS 1 PASS 1 FAIL 4

Expected Outcome:

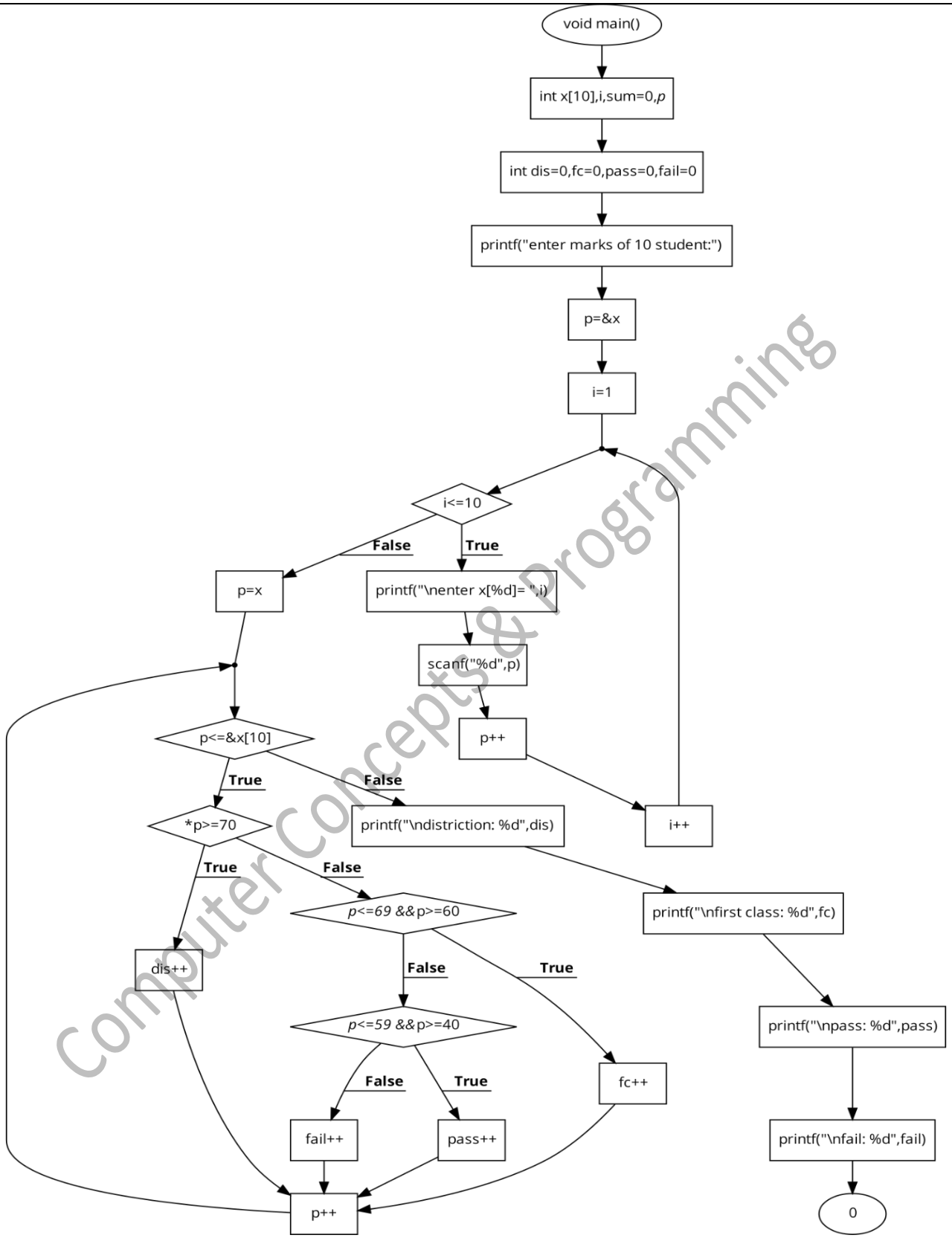
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output and are requested to gain all categories of results, so input the values accordingly, also write the counts of all the categories.

Sr. No.	Input	Distinction	First Class	Pass	Fail
1.					
2.					
...					
10.					
	Counts				

Algorithm:

Step 1 : Start
Step 2 : Input marks
Step 3: IF marks>70 THEN
++w and add count into Distinction
ELSE GOTO STEP 4
Step 4: IF marks> 60 and marks<70 THEN
++x and add count into FIRST CLASSELSE GOTO STEP 5
Step 5: IF marks> 40 and marks<59 THEN
++y and add count into PASS
ELSE
++z and add count into FAIL
Step 6: Stop

Flowchart

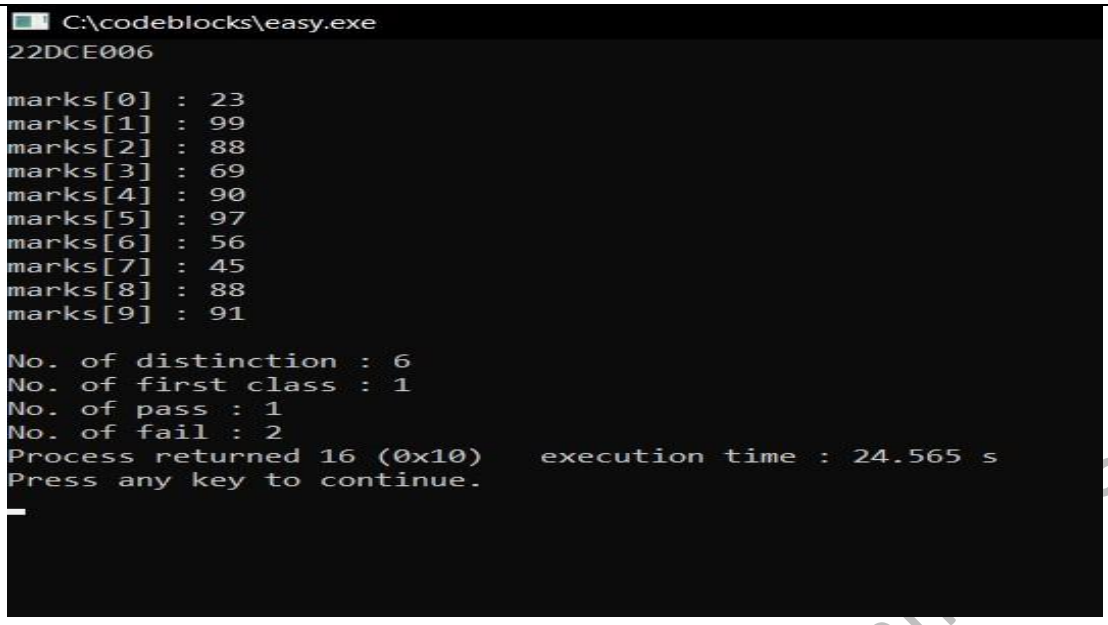


Code

```
#include<stdio.h>
void main()
{
   int marks[10],*p,i;
```

```
    int dis=0,fc=0,pass=0,fail=0;
    p=&marks;

    printf("22DCE006\n\n");
    for(i=0;i<10;i++)
        {
       printf("marks[%d] : ",i);
       scanf("%d",&marks[i]);
    }
    for(p=marks;p<&marks[10];p++)
    {
       if(*p>=70)
       {
          dis++;
       }
       else if(*p<=69 && *p>=60)
       {
          fc++;
       }
       else if(*p<=59 && *p>=50)
       {
          pass++;
       }
       else
       {
          fail++;
       }
    }
    printf("\nNo. of distinction : %d",dis);
    printf("\nNo. of first class : %d",fc);
    printf("\nNo. of pass : %d",pass);
    printf("\nNo. of fail : %d",fail);
}
```

Output



Questions:

1. Explain the importance of using pointers?

- Pointers provide a way to return more than one value to the functions
- Reduces the storage space and complexity of the program
- Reduces the execution time of the program
- Provides an alternate way to access array elements
- Pointers can be used to pass information back and forth between the callingfunction and called function.
- Pointers allow us to perform dynamic memory allocation and deallocation
- Pointers helps us to build complex data structures like linked list, stack, queues, trees, graphs etc.
- Pointers allow us to resize the dynamically allocated memory block.

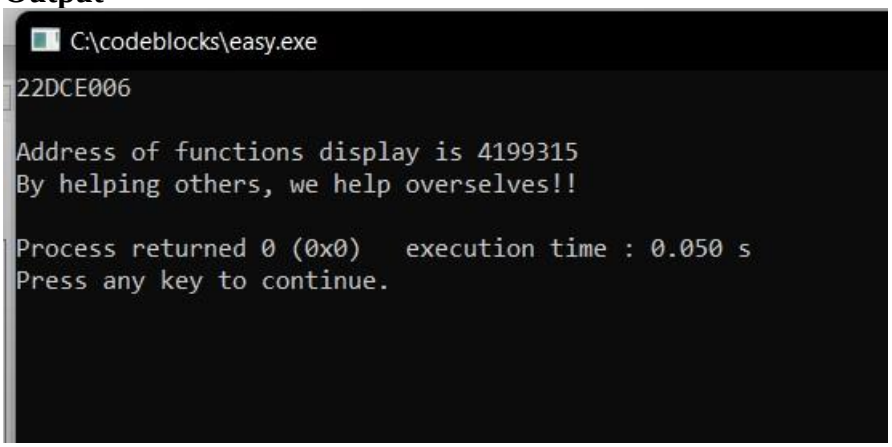
11.2 Write output for the following programs:

1. (Pointers to Functions)

```
#include<stdio.h>
void display();
int main() {
void (*func_ptr)(); func_ptr=display;
printf("22DCE006\n\n");
printf("Address of functions display is %u\n",func_ptr); (*func_ptr)();
return 0;
```

```
        } void display()
{ puts("By helping others, we help overselves!!"); }
```

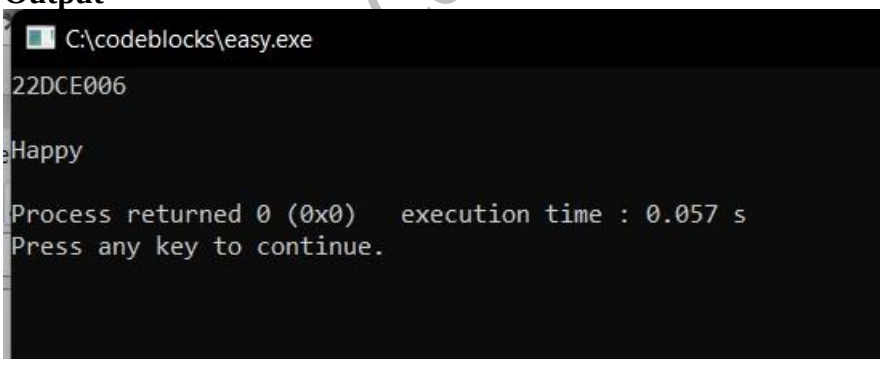
Output



2. (Functions Returning Pointers)

```
char *copy (char*,char *); int main() {
   printf("22DCE006\n\n");
char *str; char source[] = "Happy"; char target[10]; str=copy(target,source);
     printf("%s\n",str); return 0;
} char *copy(char *t,char *s)
{
char * r; r = t; while(*s!='\0')
{
*t=*s; t++; s++; }
*t='\0'; return(r);
}
```

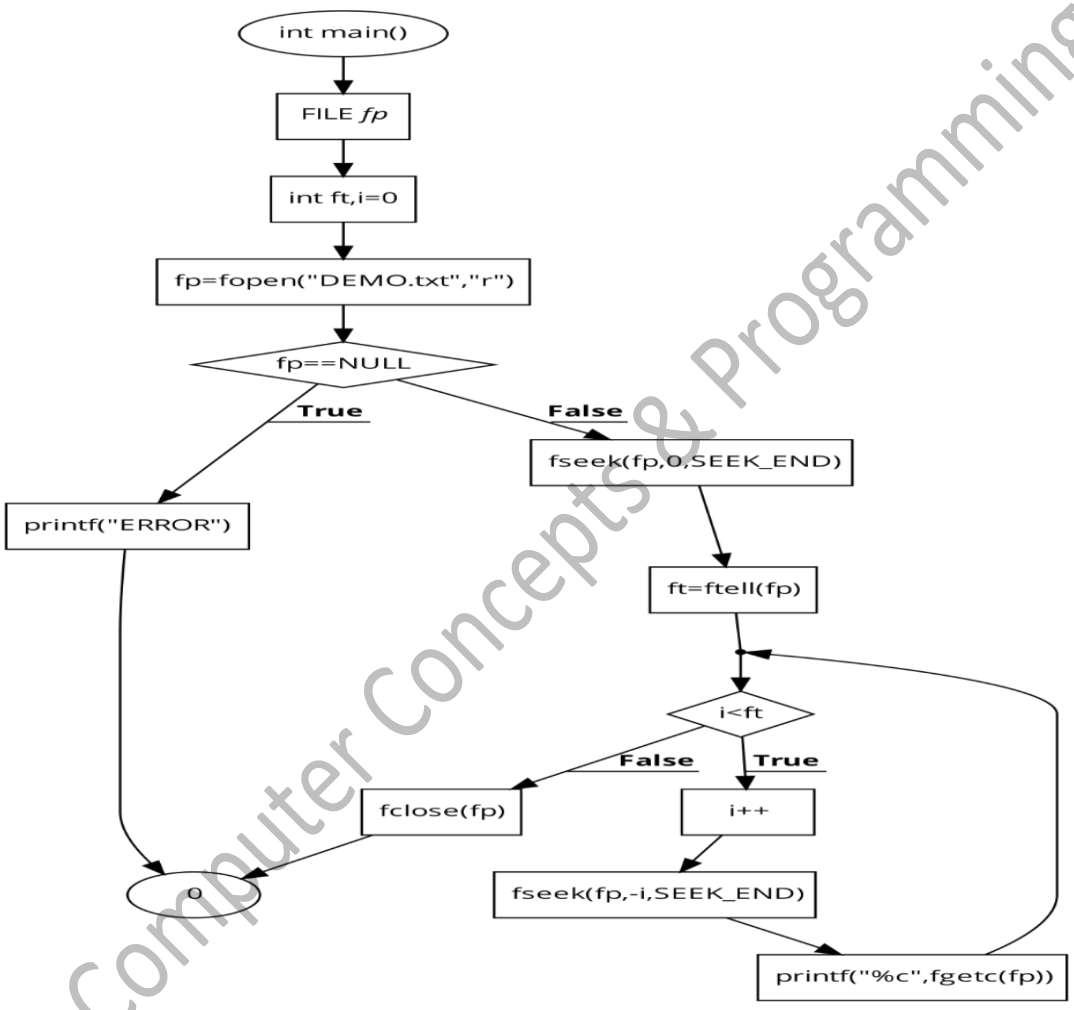
Output



12.1	Write a program to read a text file 'Demo.txt' and print each word of that file in reverse order. Expected Output: Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Example: Input: HELLO Output: OLLEH **Algorithm :** Step 1 : Start

Step 2 : Declare file pointer fp, character ch, and integer i and posStep 3
: Open file Demo.txt
Step 4 : If f(p==NULL) then print filr does not exist..!!
Step 5 : Else fseek(fp,0,SEEK_END)
Step 6 : i=0
Step 7 : If (i<pos)
i++ and fseek(fp,-I,SEEK_END) then print output
Step 8 : End

Flowchart:

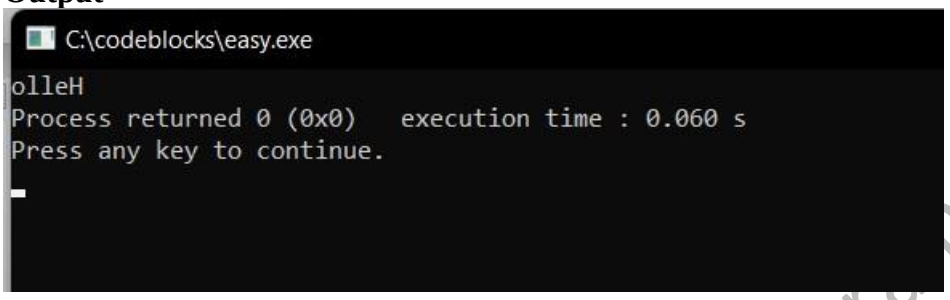


Code

```
#include<stdio.h>
#include<stdlib.h>
 int main()
{
FILE *fp;
int ft,i=0; fp=fopen("D:\\Probin's Work\\DEMO.txt","r"); if(fp==NULL)
{
printf("ERROR"); return 0;
```

```
        }
        fseek(fp,0,SEEK_END); ft=ftell(fp);
        while(i<ft)
        {
        i++;
        fseek(fp,-i,SEEK_END); printf("%c",fgetc(fp));
        }
        fclose(fp); return 0;
}
```

Output



Questions:

1.Explain, why do we need to use files in C?

ANS: comes the need of file handling in C. File handling in C enables us to **create, update, read**, and delete the files stored on the local file system through our C program.The following operations can be performed on a file. There are many functions in the C library to open, read, write, search and close the file.

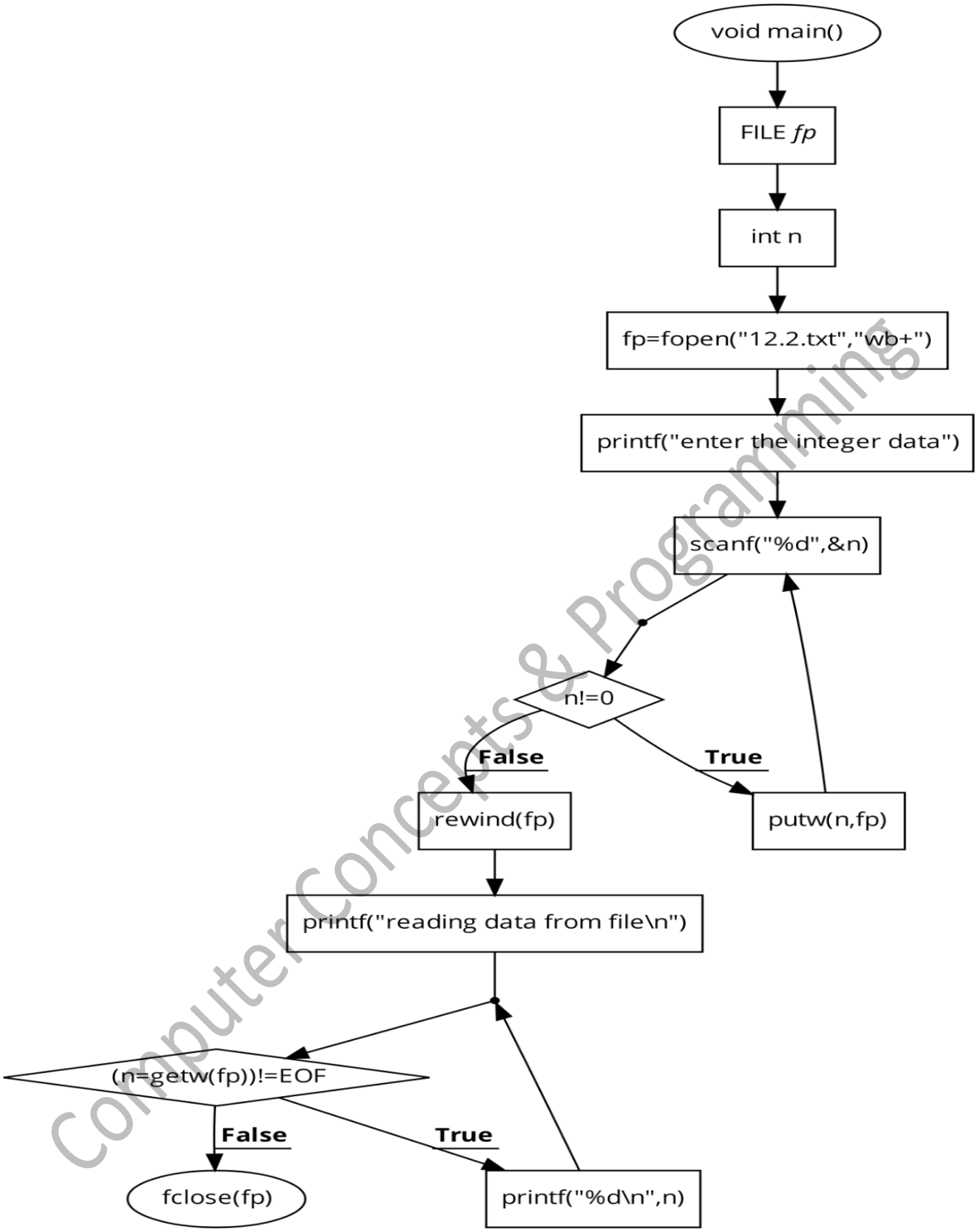
12.2

Write a C program that illustrates how to write into a file using putw() function and how to readthe same file using getw() function. Use fopen(), fclose(), getw() and putw() functions. Expected Outcome. Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Enter the data in a file from console and retrieve that data on the console.Also attach the screenshot of file where the data is written.

Algorithm :

Step 1 : Start
Step 2 : Declare file pointer fp, and integer n1 and n2
Step 3 : Open file num.txt
Step 4 : If (fp==NULL)
Then print file does not exist..!!
Step 5 : Else print enter an integer value
Step 6 : get value in n1
Step 7 : put n1 in fp
Step 8 : close file fp
Step 9 : Open file num.txt
Step 10 : get fp in n2 Step
11 : print n2
Step 12 : close file fp
Step 13 : End

Flowchart

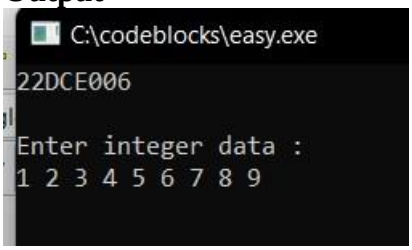


Code

```
#include<stdio.h>
#include<string.h>
void main()
{
   FILE *z;
   int n;
```

```
    printf("22DCE006\n\n");

    z=fopen("D:\\Probin's Work\\demo.txt","w");
    printf("Enter integer data :\n");


   do
    {
       scanf("\n%d",&n);
       putw(n,z);

    }while(n>=0);
    printf("Reading the data .");
fclose(z);
}
```

Output



Question:

1. Explain any 3 functions of file other then mentioned in the problem.

Sr. No.	Function	Purpose
1.	feof()	function finds the end of file.
2.	fscanf()	function reads formatted data from file.
3.	fprintf()	function writes formatted data to a file.

12.3

Two files Data1.txt and Data2.txt contains list of integers. Write a program to produce file Data3.txt which holds as merged list of these two lists. Use **command line argument** to specify the file name.

Expected Outcome:

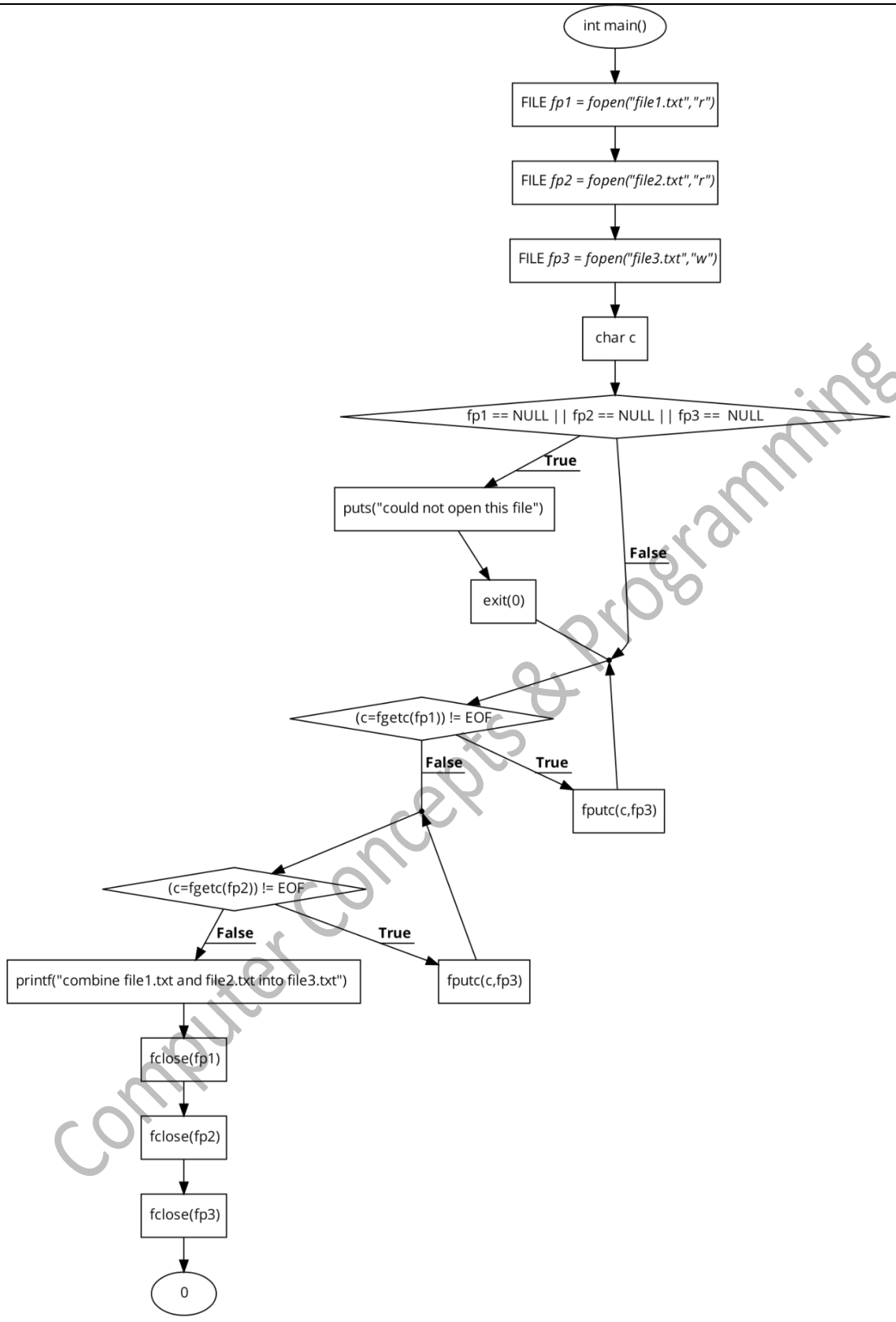
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

Enter the data in a file from console and attach the screenshots of Data1.txt, Data2.txt and

Data3.txt files. Also add the screenshot of console.

Algorithm :
Step 1 : Start
Step 2 : Declare file pointer fp1,fp2,fpmerge then character fname1[20],fmane2[20],fname3[30]
Step3 : Enter the first file and second file name
Step 4 : Enter your new file name
Step 5 : pen file fname1,fname2,fname3 in fp1,fp2,fpmerge
Step 6 : If (ch=fgetc(fp1)!=EOF)
Then fputc(ch,fpmerge)
Step 7 : Else if (ch=fgetc(fp2)!=EOF) . Then fputc(ch,fpmerge)
Step 8 : Print The two file merged into new file successfully..!!
Step 9 : Close file fp1,fp2,fpmerge
Step 10 : End

Flowchart

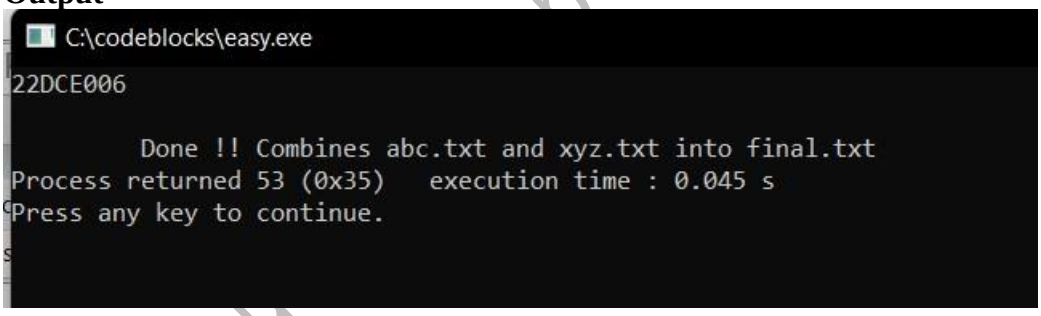


Code

```
#include<stdio.h>
#include<string.h>
void main()
{
```

```
    FILE *fp,*fw,*fp1;
    char a,b;

    printf("22DCE006\n\n");

    fp=fopen("D:\\Probin's Work\\demo.txt\\abc.txt","r");
    fp1=fopen("D:\\Probin's Work\\demo.txt\\xyz.txt","r");
    fw=fopen("D:\\Probin's Work\\demo.txt\\final.txt","w");

    while((a=getc(fp))!=EOF)
    {
       putc(a,fw);
    }
    printf("\t");
    while((b=getc(fp1))!=EOF)
    {
       putc(b,fw);
    }
    fclose(fp);
    fclose(fp1);
    fclose(fw);

    printf(" Done !! Combines abc.txt and xyz.txt into final.txt ");
}
```

Output

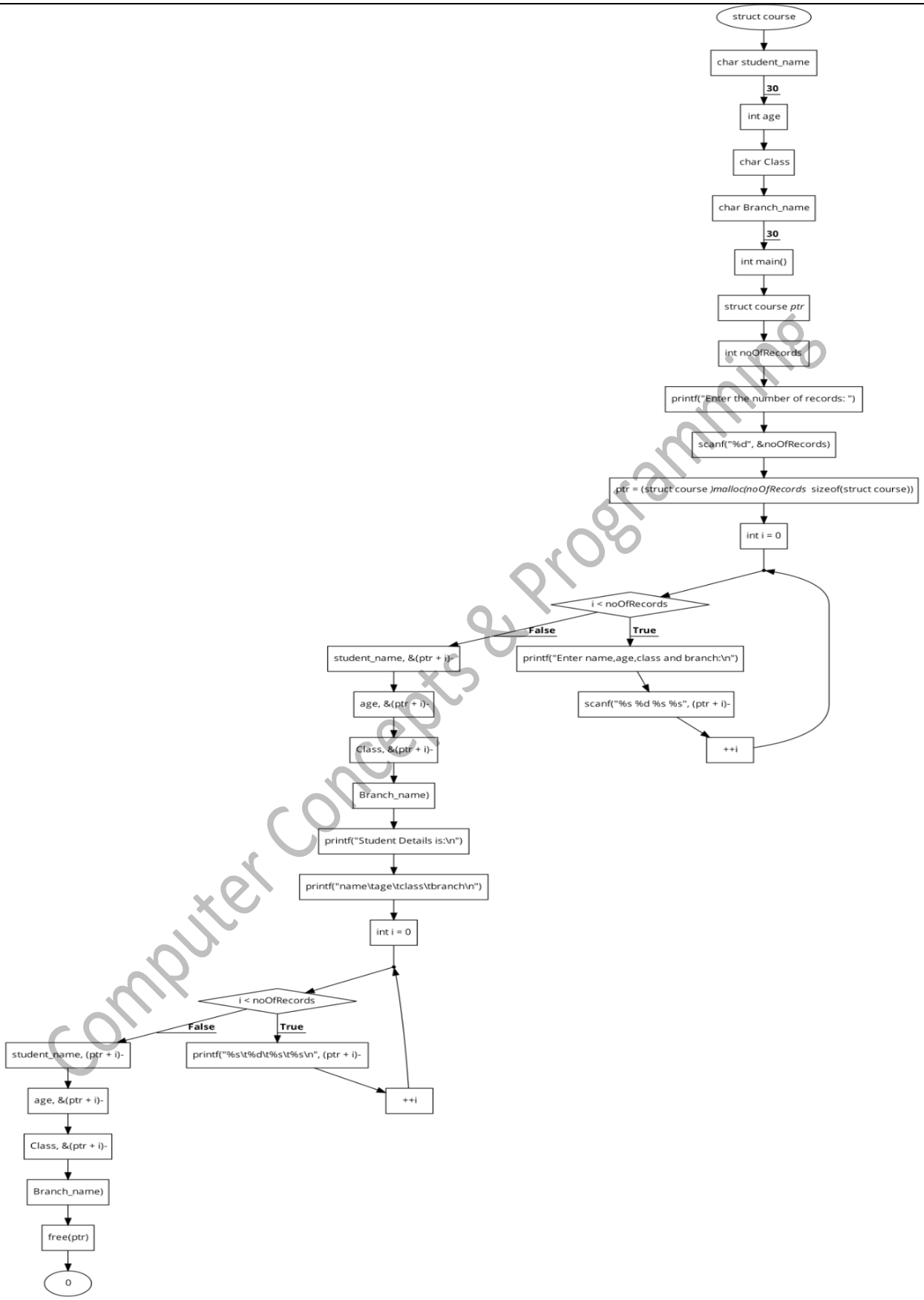


Question

1.Explain The Difference Between Argc And Argv Along With Their Significance.

Ans:The parameter “argc” refers to the argument count, whereas “argv” refers to a character array that holds all the arguments that are passed to the “main ()” function through the command line at the time of executing a program in C.

13.1	Write a program to read and print the student details using structure and Dynamic Memory Allocation. Following student details needs to be included: Roll No., Name, Age, Class, Branch. **Expected Outcome:** Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Enter this student details for N number of students, collect the no. of details to be entered from the user and ask for that many student's details. Enter all details in below mentioned table and print the values collected from user. **Algorithm:** Step 1: Start Step 2: Declare a structure studen) which consists details ofstudent (With Membrers -name, roll , age , branch, class) Step 3: Take input from user(Name, roll , age , branch, class) Step 4: Print student details Step 5:Stop **Flowchart:**



Code:-

```
#include<stdio.h>
struct student
{
   int roll;
   int age;
   char name[25];
   char b_class[10];
   char branch[10];
};

void main()
{
   struct student *ptr;
   int record ,i;
   printf("22DCE006\n\n");
   printf("Enter the number of students whose data has to be collected: ");
   scanf("%d",&record);
   printf("\n\n");
   ptr=(struct student*)malloc(record*sizeof(struct student));

   for(int i=0 ; i<record ; ++i)
   {
      printf("\nEnter the roll number of the student: ");
      scanf("%d",&(ptr+i)->roll);

      printf("Enter the age of the student: ");
      scanf("%d",&(ptr+i)->age);

      printf("Enter the name of the student: ");
      scanf("%s",(ptr+i)->name);

      printf("Enter the class of the student: ");
      scanf("%s",(ptr+i)->b_class);

      printf("Enter the branch of the student: ");
      scanf("%s",(ptr+i)->branch);

   }

   printf("\n\n Displaying the given content: \n\n ");
   printf("Roll\tAge\tName\tClass\tBranch");
   for(int i=0 ; i<record ; ++i)
   {

      printf("\n%d \t%d \t%s \t%s \t%s\n",(ptr+i)->roll,(ptr+i)->age,(ptr+i)->name,
            (ptr+i)->b_class,(ptr+i)->branch);
   }
   free(ptr);
}
```

Output-

```
C:\Users\Administrator\Desktop\filenew.exe
22DCE006

Enter the number of students whose data has to be collected: 3



Enter the roll number of the student: 11
Enter the age of the student: 18
Enter the name of the student: ram
Enter the class of the student: A
Enter the branch of the student: CE

Enter the roll number of the student: 12
Enter the age of the student: 18
Enter the name of the student: shyam
Enter the class of the student: A
Enter the branch of the student: CE

Enter the roll number of the student: 13
Enter the age of the student: 18
Enter the name of the student: raj
Enter the class of the student: A
Enter the branch of the student: CE


 Displaying the given content:

 Roll   Age     Name    Class   Branch
11      18      ram     A       CE

12      18      shyam   A       CE

13      18      raj     A       CE

Process returned 1 (0x1)   execution time : 35.775 s
Press any key to continue.
```

Questions:-

Q1) Explain the benefits of using dynamic memory allocation. Give one scenario where it is most useful.

- The C malloc() function stands for memory allocation. It is a function which is used to allocate a block of memory dynamically. It reserves memory space of specified size and returns the null pointer pointing to the memory location. The pointer returned is usually of type void. It means that we can assign C malloc() function to any pointer.

Malloc use in declare the size of an array. Malloc allocate the memorydynamically.

13.2 Write a program using a character string in a block of memory space created by calloc () and then modify the same to store a larger string using realloc () function. (Dynamic Array).Expected Outcome: Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output.

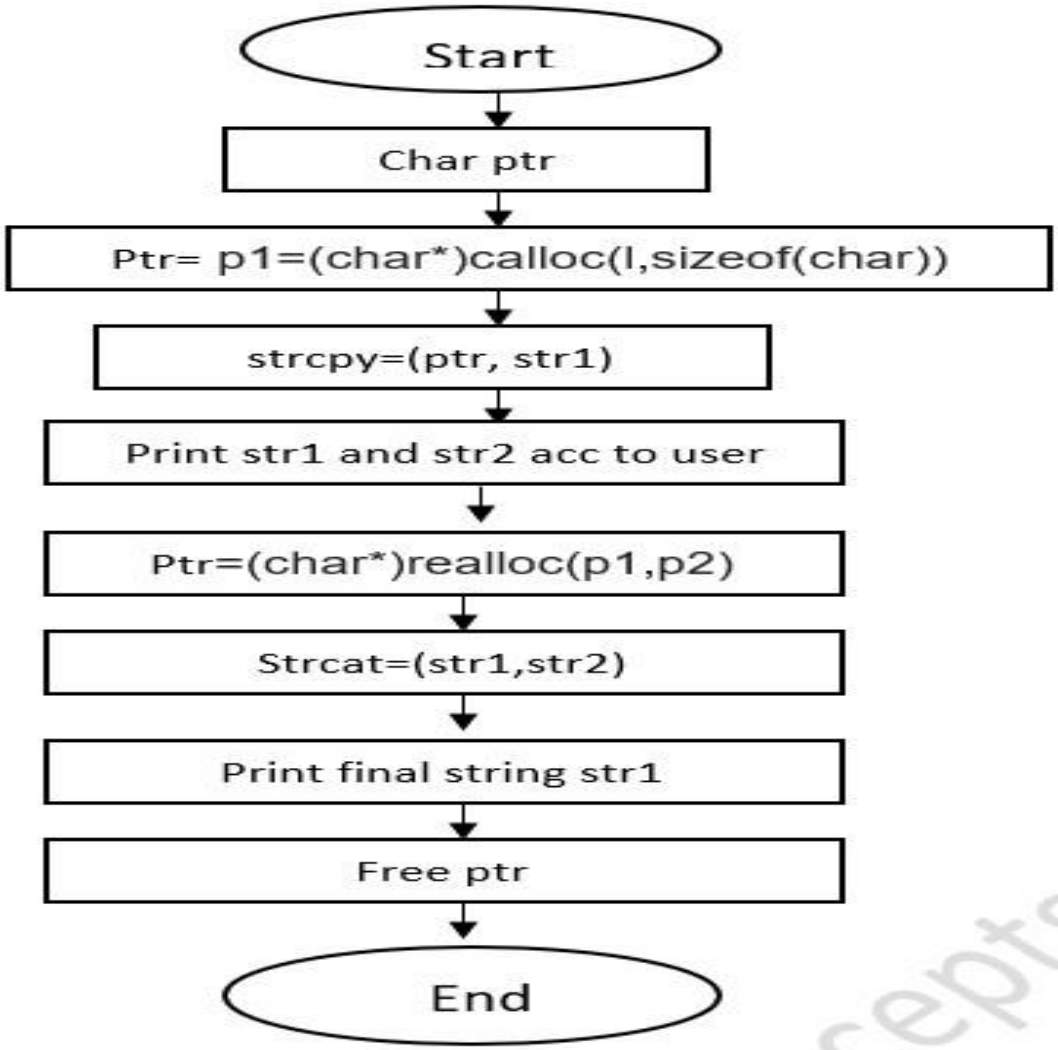
Enter the details in below given table as per the requirement:

Sr. No.	Instruction	Output
1.	**String to be entered**	
2.	**String received after reallocation of memory**	

Algorithm:

Step 1: Start
Step 2: Input char ptr
Step 3:ptr=(char)calloc(str1)
Step 4: copy the string using strcpy(ptr, str1)Print ptand address of ptr
Step 5: ptr = (char*)realloc(ptr , str1)
Step 6: add C in ptr using strcat(ptr,str2)
Print ptr and othe string of ptr
Step 6: free(ptr) to free remaining memory
Step 7: Stop

Flowchart

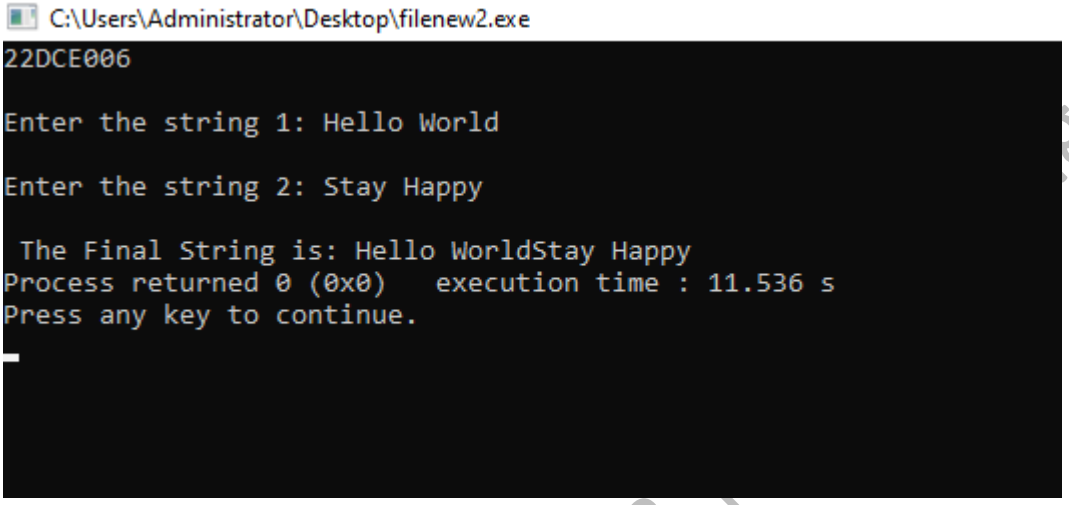


Code

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>

int main()
{
    char *p1;
    size_t l=30;
    char p2[30];
    char str1[30];
    char str2[30];
    printf("22DCE006\n\n");

    printf("Enter the string 1: ");
    gets(str1);
    printf("\nEnter the string 2: ");
    gets(str2);
```

```
    p1=(char*)calloc(l,sizeof(char));
    strcpy(p1,str1);
    p1=(char*)realloc(p1,p2);
    printf("\n The Final String is: %s",strcat(p1,str2));

    return 0;
}
```

Output-



Questions:

1. Mention advantage of using realloc() function.
   - Ans- It increases or decreases the size of the specified block of memory, moving it ifnecessary

   - This method helps is dynamic memory management.
   - It helps to reuse the memory blocks that are not being used further. Since only the storage being referenced by the...

   All dynamic allocation (malloc, calloc or realloc)and deallocation (free) methods takescare that memory allocations to MEMORY.

13.3 Write a program to enter N numbers into array and find average. Enter the size of the array through keyboard. (Dynamic Array). Use malloc () to allocate memory and use free() to free the memory after the use.

Expected Outcome:

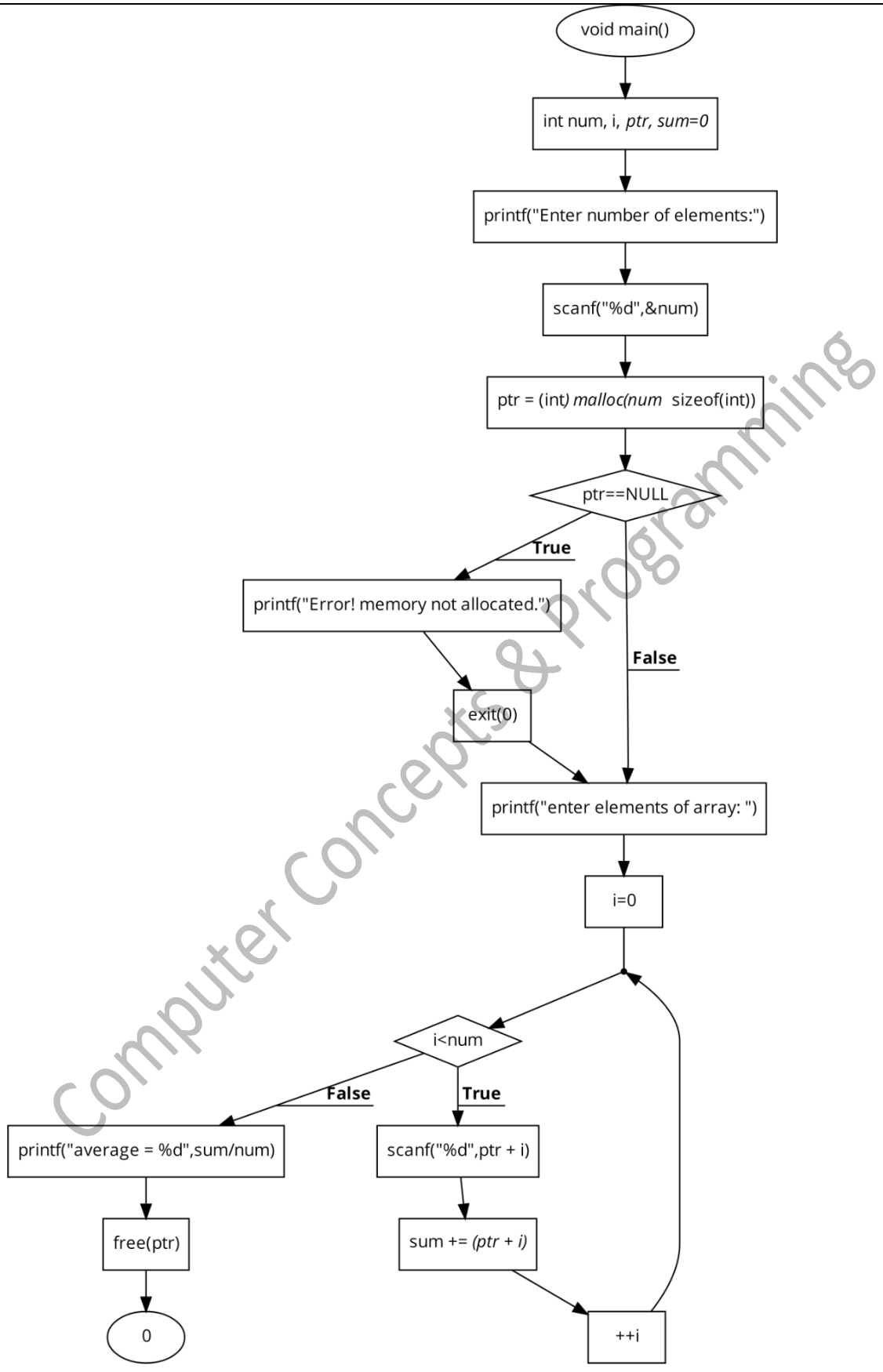
Draw flowchart, write algorithm and program for given scenario. Also attach screenshot of output. Enter the details in below given table as per the requirement:

Sr. No.	Instruction	Output
Enter the size of Array		N (To be entered by user)
1.		To be entered by user
2.		To be entered by user
...		To be entered by user
N.		To be entered by user
Average of entered values		

Algorithm:

Step 1: Start
Step 2: Input array elements
Step 3: ptr = (int*)malloc(limit * sizeof(int))
Step 4: IF i<limit THEN
Input ptr+i
Print ptr+i
sum += *(ptr + i)
avg=sum/limit
Step 5: Print avg
Step 6: free(ptr)
Step 7: Stop

Flowchart



Code-

```
#include<stdio.h>
#include<stdlib.h>
void main()
{
   int num , *ptr , sum=0;
   printf("22DCE006\n\n");
   printf("Enter the number of elements ");
   scanf("%d",&num);
   ptr=(int *)malloc(num*sizeof(int));

   if(ptr==NULL)
   {
      printf("Memory not allocated !!! ");
      exit(0);

   }

   printf("Enter the element:");

   for(int i=0 ; i<num ; ++i)
   {

      scanf("%d",ptr+i);
      sum+= *(ptr+i);
   }
   printf("Average is %d",sum/num);
   free(ptr);


}
```

Output-

C:\Users\Administrator\Desktop\filenew3.exe

```
22DCE006

Enter the number of elements 5
Enter the element:1 2 3 4 5
Average is 3
Process returned 1 (0x1)   execution time : 110.286 s
Press any key to continue.
```